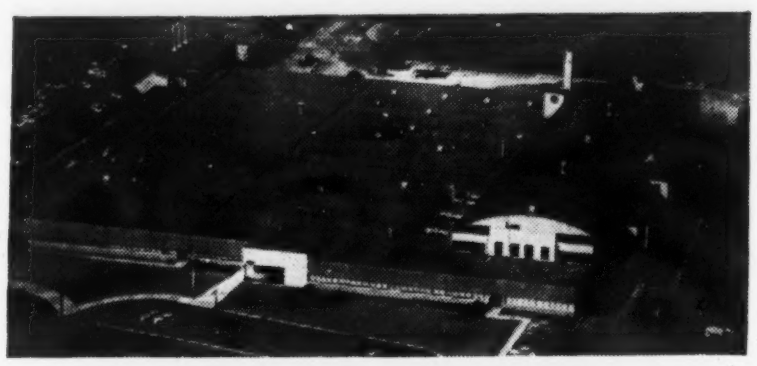
SIGNAL

Communications-Electronics-Photography

1951 AFCA AWARDS TO ROTC

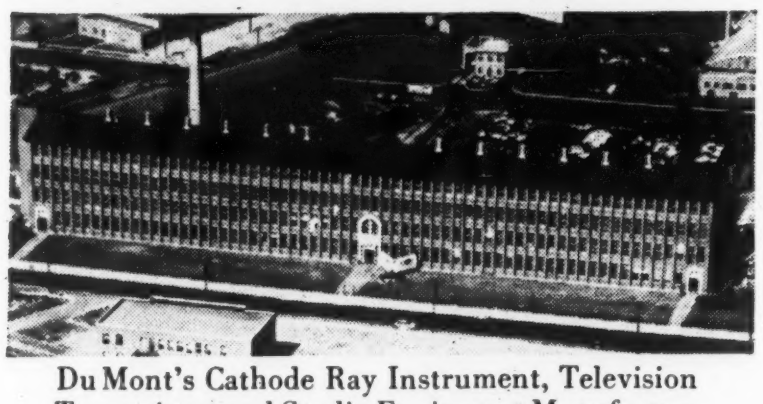
Du Mont

Manufacturing Facilities for Quantity and Quality Electronic Products



Du Mont's Cathode Ray Tube Manufacturing Plant, Clifton, New Jersey—180,416 sq. ft.

Du Mont's Television Receiver Plant, East Paterson, New Jersey—481,134 sq. ft.



Du Mont's Cathode Ray Instrument, Television Transmitter, and Studio Equipment Manufacturing Plant, Clifton, New Jersey—139,561 sq. ft.

Du Mont's Research and Tube Development Laboratory, Passaic, New Jersey—107,836 sq. ft.

Sealing the glass face-plate to the metal cone of a 30-inch cathode ray tube—the world's largest tube of this type—suitable not only for television picture use but also for special military and industrial purposes. The sealing operation is completed in five minutes on an automatic sealing machine developed by Du Mont.

EXPERIENCED electronic engineers . . . Du Mont production "know-how" . . . ample plant facilities for high-speed mass production. All these are available for development contracts and large-scale production runs for both the civilian market and government services.

For example, the Du Mont Cathode Ray Tube Plant in Clifton, New Jersey, has more than 180,000 square feet of floor space. In this modern plant, skilled electronic engineers supervise the production of more than a million cathode ray tubes a year . . . tubes of all sizes, tubes for many purposes.

Over-all electronic manufacturing facilities at Du Mont comprise 908,947 square feet, four plants, 22 buildings . . . all designed, engineered, and equipped for maximum efficiency in manufacturing and assembly.

If you have an electronic production problem, contact Du Mont. Or write for your copy of the booklet that will give you the story of Du Mont's "Facilities for Defense." We will be glad to send you a copy on request.

Precision Electronics and Television DU MONT 20th YEAR AS PIONEER

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ALLEN B. DU MONT LABORATORIES, INC., HOME OFFICE, 750 BLOOMFIELD AVENUE, CLIFTON, NEW JERSEY

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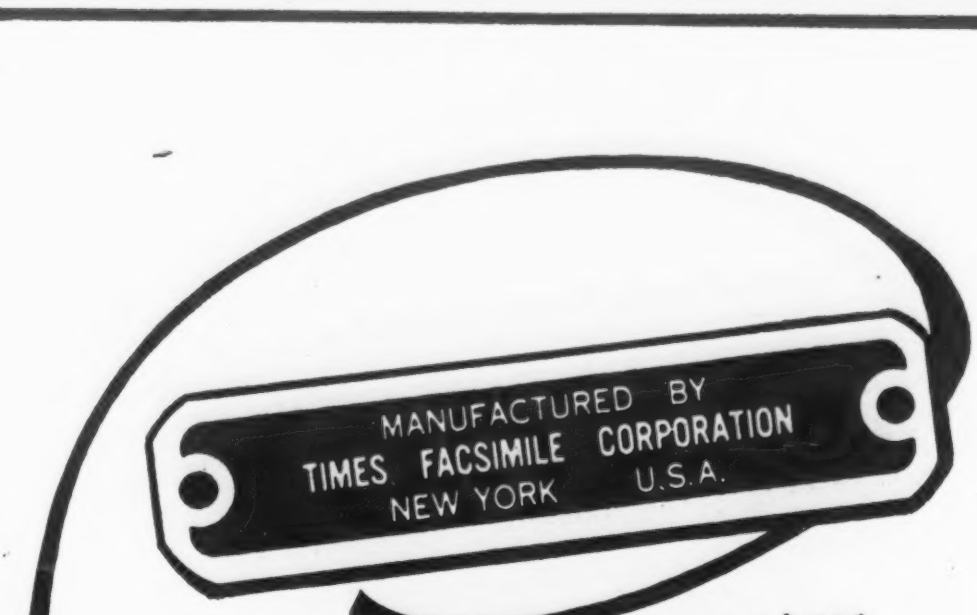

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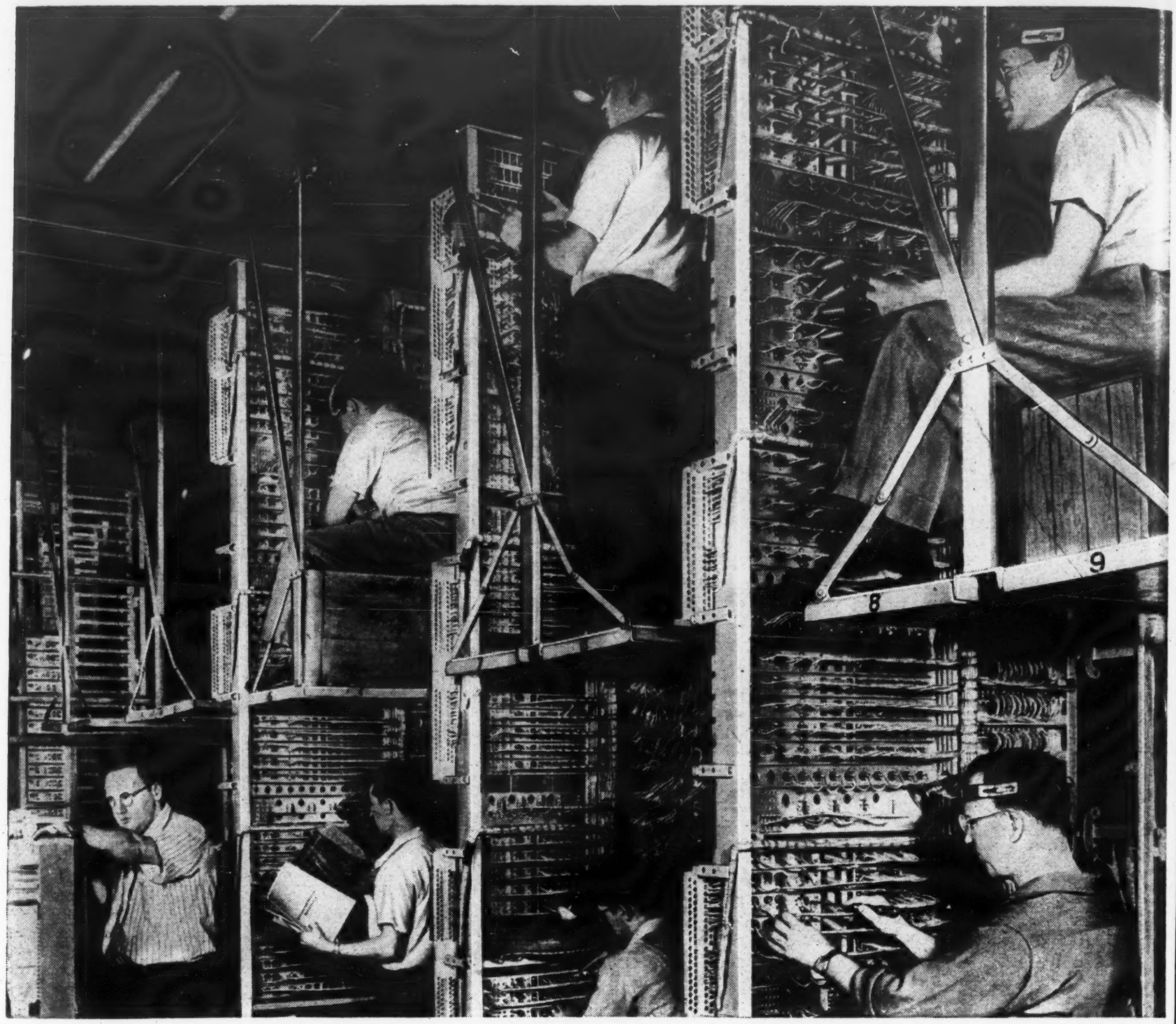

Dial telephone equipment for Bell System getting final check at a Western Electric factory.

BUSY... behind the lines

TODAY, telephone lines are defense lines. We're hard at work making more telephone equipment to carry the calls that speed America's production, direct civilian defense, and guide the Armed Forces.

ONE BIG REASON why America has dependable telephone service today is that Western Electric, the manufacturing unit of the Bell System, has worked hand in hand over the years with Bell Telephone Laboratories who design the equipment and the telephone companies who operate it.

IN ADDITION, we're busily applying our long Bell System experience to making special electronic and communications equipment needed by the Armed Forces for the protection of this country.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

SIGNAL

Communications-Electronics-Photography

Journal of the Armed Forces Communications Association

VOLUME 5 | JULY-AUGUST 1951 | NUMBER 6

CONTENTS

FEATURES

DEPARTMENTS

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THE COVER

In this issue, in accordance with our yearly custom, the Association Affairs section features photos of winner of AFCA awards made to outstanding ROTC cadets in AFCA's especial field. The cover shows Major Ralph A. Newman, USAF, PAS&T at Lehigh University, congratulating AFCA award winners Harold W. Chapman (left) and F. Gordon Maxson. (See Lehigh U in Association Affairs for details.)

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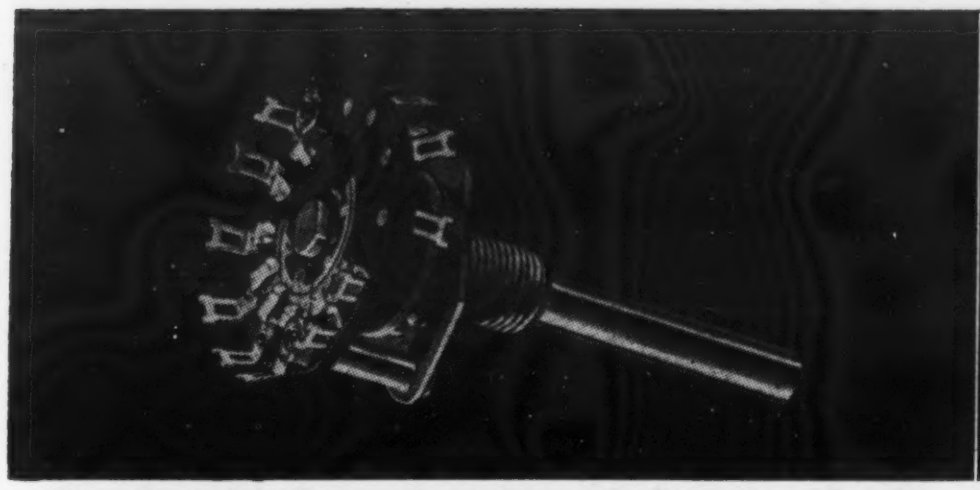
1951

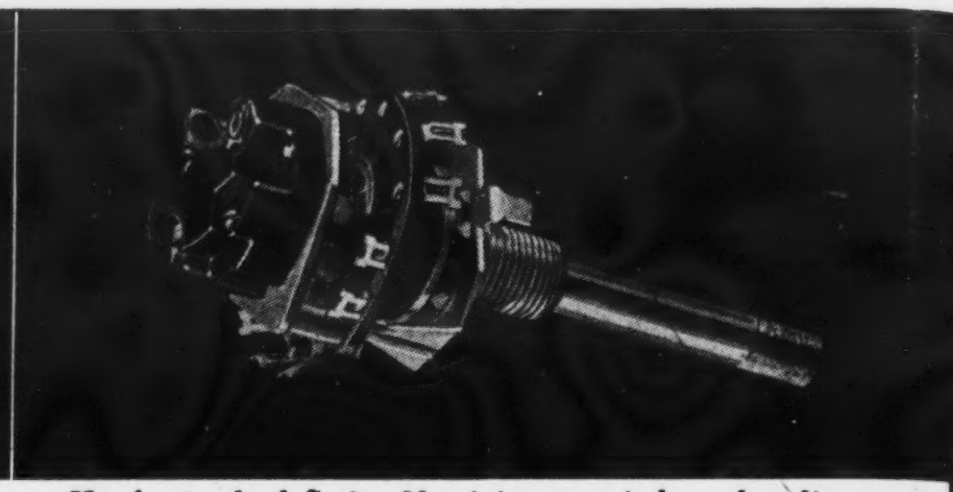
CENTRALAB ANNOUNCES

NEW MINIATURE ROTARY SWITCHES

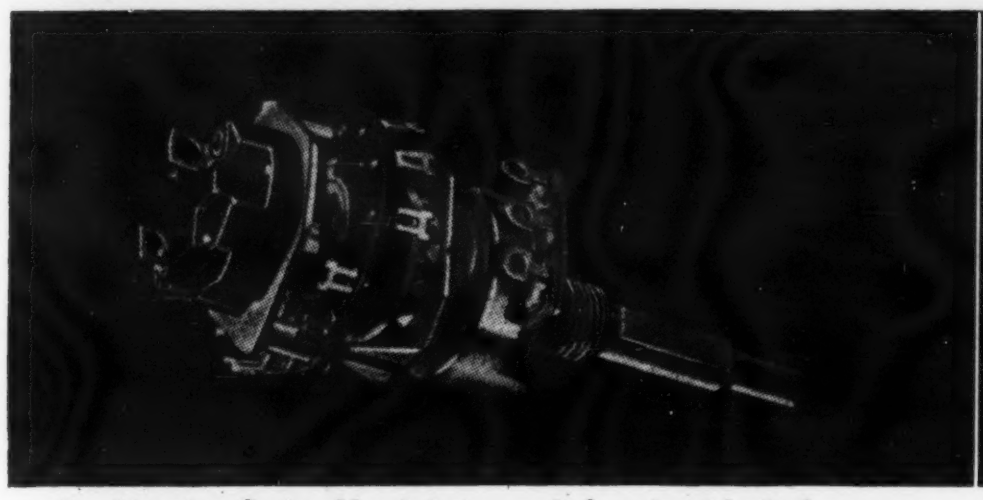
FOR COMMERCIAL OR MILITARY HIGH FREQUENCY APPLICATIONS



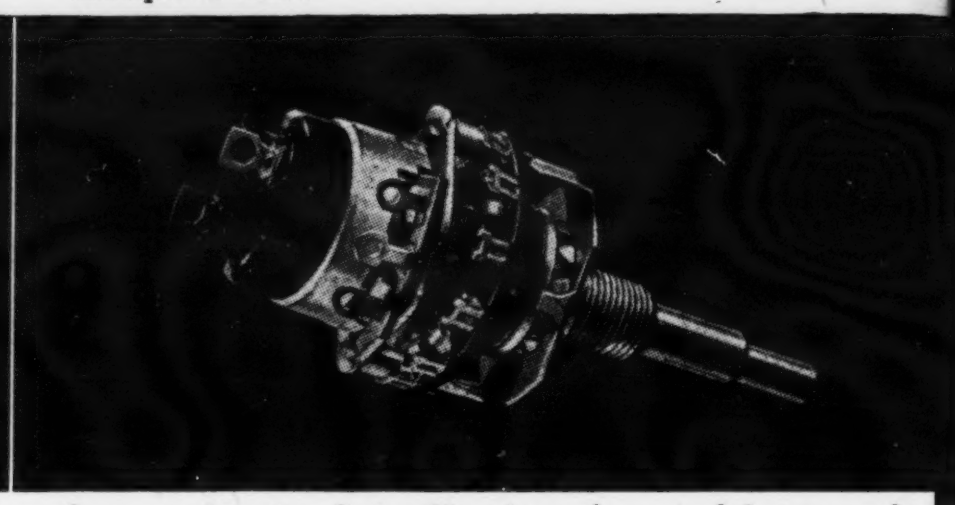
New Centralab Series 20 miniature single section phenolic switch. Available in 2 to 12 positions, with stops or continuous rotation — and with multiple sections.



Here's standard Series 20 miniature switch — phenolic section with off-on switch added. Standard shaft. Also available with multiple sections.



Combination Series 30 miniature switch unit with dual concentric shaft — permits independent operation of miniature switch and Model 2 variable resistor including off-on switch.



Same combination Series 30 unit as shown at left, *except* that Model 2 variable resistor is mounted at rear of miniature switch. Position of resistor provides convenience of wiring.

Now Centralab offers a completely new, unusually small rotary switch line — available in a variety of multi-pole, multi-position, multi-section models and in combination with line switches and variable resistors.

New Centralab Miniature Switches Give You Top-Quality Construction & Performance

Centralab's new Series 20 and Series 30 miniature switches have every quality-construction feature — every quality-performance characteristic as furnished with the larger standard size Centralab switch line. Clips and contacts are spring brass with heavy silver plating or coin silver. All other metal parts are adequately plated to meet commercial or government specifications. Sections are finest quality laminated phenolic or Centralab's own grade L-5 Steatite. Switches have positive 30° indexing, available in 2 to 12 positions with stops or 12 position continuous rotation — and with multiple sections. Also available with plain or dual concentric shafts, attached line switches, and in combination with famous Model 2 Radiohm variable resistors mounted either at front or rear of switch according to wiring need.

IF YOUR prime consideration in design of modern electronic gear is small size, smooth performance and long life, get the full facts on these entirely new Series 20 and Series 30 miniature rotary switches by Centralab. You'll find they're not only among the world's smallest — but the most reliable too. Because of their compact size, plus the availability of extra sections and index assemblies — they give electronic engineers broad design latitude. Write Centralab Div., Globe Union 928 East Keefe Avenue, Milwaukee 1, Wisconsin.

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✔ 30% more production will soon be available from American Lava Corporation as new units rapidly near completion.

✔ Continuous expansion to meet customers' requirements has made American Lava the world's largest producer of custom made technical ceramics exclusively.

✔ Average daily production approximates four million parts and is rapidly increasing.

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ALSIMAG

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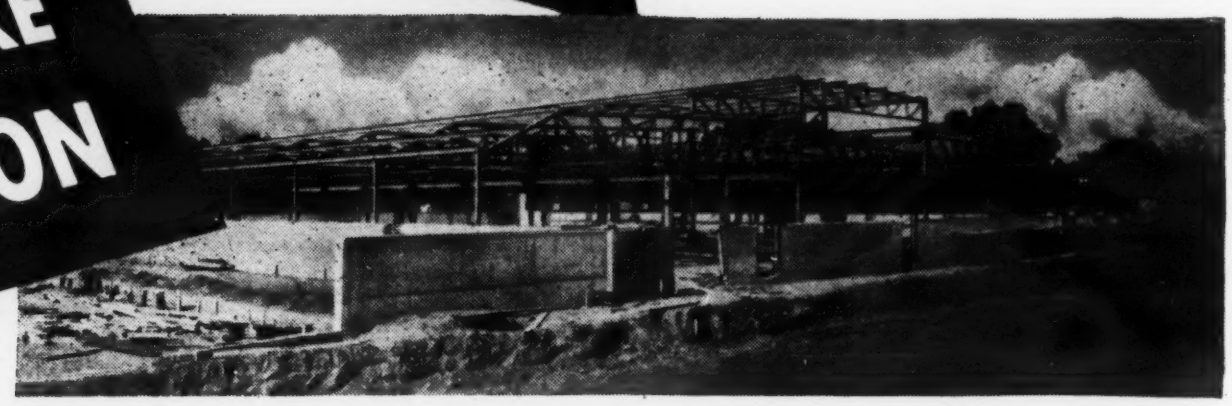
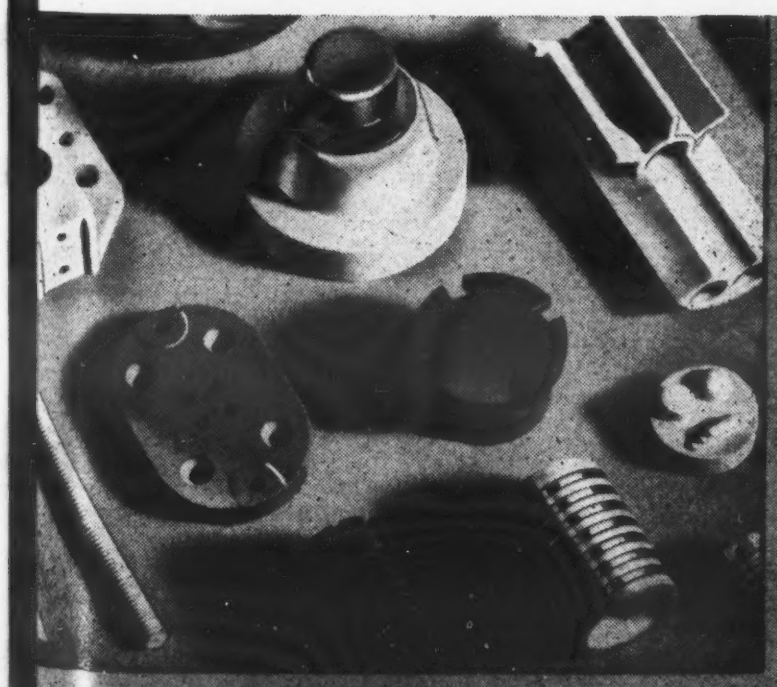
30% MORE PRODUCTION



This building, photographed in May 1951, will be completed about the time this picture is published. Other units will speedily follow.



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• Equipment shown in this mock up is under construction. Carefully selected personnel has been added to the present skilled staff to provide experienced operators for all plants.

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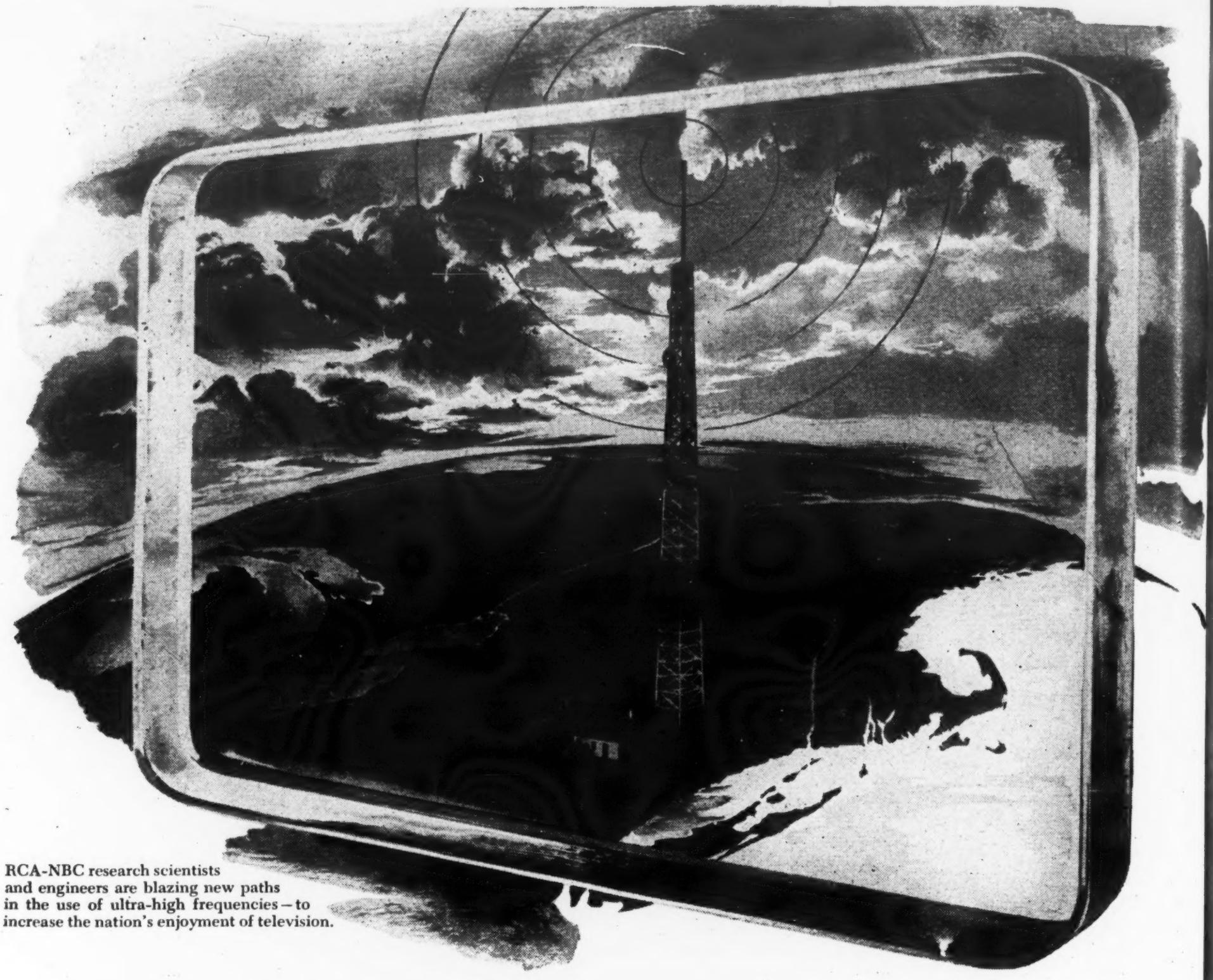


RCA-NBC research scientists and engineers are blazing new paths in the use of ultra-high frequencies—to increase the nation's enjoyment of television.

World's first custom-built **UHF** *station —points the way to more* **TV** *for more people*

Although television now reaches 45 million people in more than 12 million homes, thousands of communities are still too far from existing stations to be reached by *any* programs. Moreover, under present conditions, many cities with limited program service want, but can't have, additional TV stations.

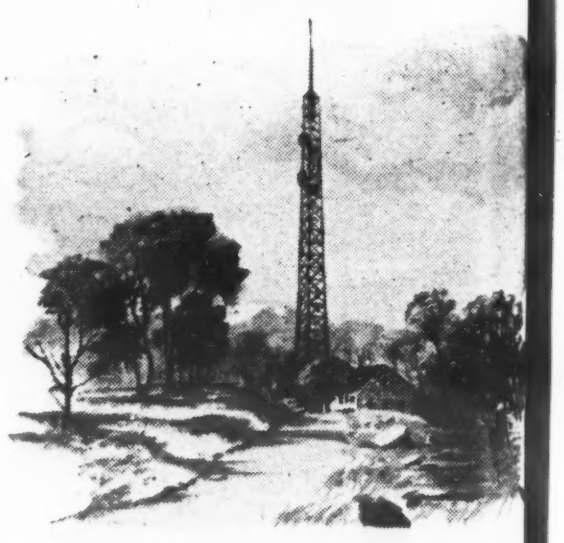
In preparation for the establishment of a country-wide television service, RCA has pioneered for many years in ultra-high-frequency (UHF) research.

Today—an experimental station built by RCA at Bridgeport, Conn., is supplying the practical experience and engineering facts needed to design the best UHF equipment—including transmitters, receivers, and converters. NBC programs on the air during the full broadcast day are used by RCA—and other manufacturers, too—for large-scale field tests.

From results of this pioneering, RCA engineers have determined that practical UHF equipment can be built to serve the public, and that present RCA Victor television sets can be readily adapted to give equally fine performance on both UHF and VHF.

* * *

See the latest in radio, television, and electronics at RCA Exhibition Hall, 36 W. 49th St., N. Y. Admission is free. Radio Corp. of America, RCA Building, Radio City, N. Y. 20, N. Y.



Built by RCA at Bridgeport, Conn.,—first UH transmitter to operate on a regular schedu

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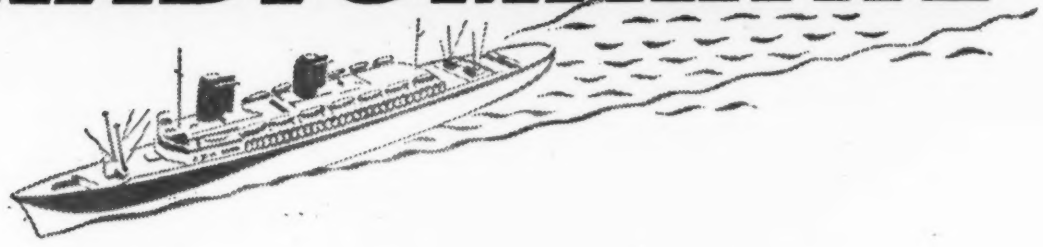

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The entire facilities of Radiomarine Corporation of America: personnel, technical knowledge, research and production capacity are "standing watch" ready to serve America's maritime and military needs.

For information on how Radiomarine can be of service to you, write to: Radiomarine Corporation of America, Department S, 75 Varick St., New York 13, N. Y.

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Spirit of the

97th Signal Operation Battalion

I'm a 97th Signal man. . . . I'm everyone who has been . . . is, . . . and will be in the 97th. I'm the spirit of the organization. A private, a non-commissioned officer, an officer. I have worked and played, sweated and laughed . . . and most important, I have done the job of furnishing communications when the chips were down.

I have only been with the 97th Signal for nine years but I have 88 years of signal experience to draw upon. I guess nine years of service doesn't seem so much to some fellows in outfits with a hundred well-served years or so behind them, and maybe the unit's history isn't as glamorous as some of the signal units that have served the U. S. Army. The guys in the 97th are proud of it, though, and believe me the years were packed with plenty of good honest signal effort and work. I'm not saying we were the only or best signal outfit in Europe . . . no sir . . . not by a long shot. The fellows in other communications units did a swell job too, and deserve a lot of credit.

So I have asked the editor of SIGNAL to let me tell my story in my own words about the 97th. I'll try not to bore you too much but I have something to say and want to get it off my chest. Most outfits are pretty much the same and I think if you do a little remembering with me, a lot of things will come back to you of the outfits you too may have belonged to.

Activation

On the 10th of April 1942, the unit saw its first day as the 97th Signal Battalion, at Fort Sam Houston, Texas. It wasn't very big then, only eight officers and twenty-four enlisted men. But the unit soon grew.

From all over the States fellows came in, regulars, reserves and others who had been inducted.

A whole new outfit had to be set up . . . and in a hurry because a war was going on and we felt quite certain that we would be in the middle of it.

We started our "basic," some for the first time, some for the second or third times.

Soon we were off to Louisiana for maneuvers. The unit was assigned to the Third Army and it was our first chance to show the kind of Signal men we were.

Some real work began. I can remember the rain and the talks by the officers on "Work, work and more work." We did work, and began to feel as if something was being accomplished. There were three companies to begin with, Headquarters, "A" and "B" companies, and while the unit was at Louisiana, Company "C" was activated.

In November 1942 we got into our vehicles and started over the roads to Camp Bowie, Texas. Some of the fellows were a little sorry to leave Louisiana . . . those Louisiana gals were pretty nice. But there was no settling down in Texas like we thought, because it seemed that we weren't in camp more than a few minutes when all of us about faced and trucked on down to Louisiana again.

We settled down for a little more training. Then darned if the outfit didn't head back for Camp Bowie, Texas. I do believe I still have callouses.

All of us thought we had real training by then, but there was lots more to come. There came a period of shifting all around the south. We became provisional platoons and detachments. These are some of the camps and places that the unit hit between April 28 and September 8, 1943. I'll name a few you might remember too. There were—Camp Bullis, Texas; Camp Maxey, Texas; Camp Howze, Texas; Camp Claiborne, Louisiana; Camp Van Dorn, Mississippi; Camp Shelby, Mississippi; Fort Clark, Texas; Camp Barkley, Texas; and Camp Polk, Louisiana. The unit was separated, and moved a lot—but still the communications were pretty darn good. Some of the guys said something about "Rat Race," but by this time we had climbed more poles than we thought ever existed, pounded more keys than an M-29 converter has, and said "number please" so many times that it was like a broken record. Rumors were flying around that we might be on our way to Europe or maybe to the Pacific . . . or else Texas again.

Then . . . in August 1944, the unit was alerted! I can remember the furloughs and kissing the gals goodbye!

So Long, USA

Along with showdown inspections we marked and remarked our clothes. The wild rumors sure were flying. I can remember the classes on malaria and tropical fever that made us sure we were going to the Pacific! There was that major who said we would be back in the States by Christmas, but he didn't say which Christmas. We're still not back.

Well, we waited, and packed and repacked until boarding the train on 6 October 1944 . . . for where . . . none of us knew. There sure was good chow on that train. We were traveling through the south and the porter finally told us we were going to Camp Shanks, New York.

Then came more processing . . . they even looked at our teeth twice. Finally we went by foot, rail, and ferryboat to Brooklyn, New York, and took a trip up a gang plank to the HMT "Largs Bay" lugging a load of combat gear. Our morale was pretty good, even the wise-cracks! Red Cross gals gave us coffee and doughnuts. At last we were going somewhere . . . and just a little nervous about it.

We finally said, "So long USA, Hello . . . who knows?" I'll never forget that trip over; and the smell of the kitchen coupled with the smell of latrines. . . . Can you? What a trip we had. . . . Seems like everybody was seasick . . . and some guy kept saying "it's blackout time" . . . the terrible chow . . . the short arm, ten days out . . . and the weird thoughts when we couldn't see the rest of the convoy . . . our first sight of that hunk of land somebody said was England. It was, and we landed in Plymouth, England. Later somebody told us that we were headed for Glasgow, Scotland but because of engine trouble our ship had to drop out of convoy two days out and proceed to the nearest port.

I was sure glad to get off that boat. We had to walk a mile and a half to

the train station, then an English train took us to New Alresford, England.

I can remember our first look at England . . . the pubs with only warm beer . . . the afternoon tea . . . the lack of sunshine . . . Piccadilly Street at midnight . . the uniform regulations . . . the difference of opinion concerning the English!

Then we took off with one hundred and seventy-seven vehicles and seventy-seven trailers for Waymouth, England, and boarded LST's on the English Channel. The water in the channel was sure rough and the weather wasn't fit for a dog, but after a while it cleared up and there was nice weather crossing to the harbor of Le Havre, France.

We spent the night in the harbor . . lights were on all over that night. It seemed odd after the blackout in England!

Right after lunch we started up the Seine River to Du Clair, France, then proceeded to Rouen where the battalion regrouped and spent the night. It was raining, snowing, and the French countryside was mighty muddy.

At four o'clock in the morning we were in our vehicles and on our way to Tongres, Belgium. The first night was spent at Binche with good old "K" rations for supper. The Belgian people were swell. Most of the officers and men were invited into the homes of the people to sleep . . . this sure relieved the billeting problem. We were then assigned to the XVI Corps. Right nice place, we thought, but then a few buzz bombs started saying hello to us. All of us looked kind of funny when one of them landed near Battalion Headquarters

The big German offensive had opened up on the night of 17 December 1944 and we could see continuous artillery action near us. The unit tasted its first direct enemy action when a Nazi plane poured down some lead near "A" and "C" companies

A verbal order from the commanding general of the XVI Corps sent us pushing our vehicles towards Heerlen, Holland, where we set up our equipment in two school buildings and some prepared dugouts.

It wasn't very long, though, before the outfit was on the move again, with two hours' notice to move to Flouse, Belgium. Except for two officers and a hundred men, who stayed behind to furnish communications for XVI Corps, we rolled down Belgian roads. We didn't stop at Flouse long and wound up instead in the woods near Awan, Belgium. There wasn't much sleep for us because lots of equipment had to be set up for operation. Tracers made the sky look like 4th of July all night long. When everything was almost set up . . . the situation changed! Headquarters, "B" Company and the medical detachment were ordered to return to Heerlen, Holland. The construction Companies "A" and "C" stayed on special duty with XVIII Airborne Corps to work with the 54th Signal Battalion.

Single mobile VHF terminal designed and constructed by "A" Troop, 97th Constabulary Signal Squadron.

The battalion's assignment was with the First United States Army under British Field Marshall Montgomery as part of the Northern Group of Armies. The Battle of the Bulge was on . . . and we were in the same Corps with the 5th and 7th Armored Division, the 82nd Airborne and the 8th Infantry Divisions. The Sixth German Panzer Army had been on the move, in our direction, but the 82nd Airborne managed to plug a gap in the area. It was cold, and the roads were covered with ice and snow, but to "A" and "C" Companies, the only things that seemed to matter was getting up that slippery pole and rolling out more line.

By the 3rd of January, the army's Northern Offensive began to take shape. The enemy's bolt was shot, and he began to move out his armor . . . what was left of it. We still had plenty of communications to furnish our troops engaged in stiff and deadly fighting, but the Battle of the Bulge was over . . . and Germany had thrown away its reserves. That's what we heard, anyhow, but it wasn't until February 1945 that "A" and "C" Companies were relieved from duty with the 54th Signal Battalion and XVIII Corps. The mission of the Ardennes offensive was successfully completed, so "A" Company got into their trucks near Montenau, Belgium and rejoined the rest of the battalion. Company "C" rolled on home from Francorchamps, Belgium. All of us got together again on the 8th of February. It sure felt good to get some good old 97th chow and see all the old gang . . . except that a couple of our pals from "C" Company weren't with us any more. We just sat around for a couple of hours and swapped stories.

Then the unit was assigned to the Ninth U. S. Army . . . and it wasn't long before the battalion broke up again. "B" Company, which was the operational company, left for Sittard, England and stood by for signal operations. The rest of us left for Leijenbroeck, Holland, where we settled down in a monastery conducted by the Sacred Heart Fathers. Conditions sure were crowded in the area. A lot of us were amazed at so many soldiers and so much equipment. We heard that this was because the American XVI Corps was taking over this front from the British XII Corps.

Many allied signal personnel have been trained by the 97th in the Military Defense Assistance Program. Below, French officers inspect latest signal methods and equipment employed by the 97th.

The battalion received another verbal order. By infiltration of one company at a time, we moved to Kaldenkirchen, Germany. Company "B" moved forward with the XVI Corps and set up in Kaldenkirchen and in Venlo, Holland. Company "C" moved to Heinsburg, Germany where the company was set up for the operation which would start the drive of the Ninth U. S. Army across the Roer River.

The Ninth Army was being held up by the Roer floods, but on February 23rd the attack was launched, throwing bridgehead after bridgehead over the rampaging Roer. The advance finally swept over the Cologne Plain towards Duesseldorf, plunging the German Fifteenth Army into wildest confusion. We played our part in this gruesome game, too . . . it was communications. Lots of it was needed. By infiltration we moved to Niedereyll, Germany . . . then to Lintfort, Germany. Some of the "C" Company fellows had to stay behind in the Heinsburg sector to clean up wire. We felt pretty much like signalmen by then. There were some funny moments, too, especially the souvenirs that started to show up!

Troop "A" of the 97th has VHF telephone radio stations located at most of the Constabulary "kasernes" in the U. S. zone of occupation.

Across the Rhine

Well, anyway, the Ninth Army was firmly established on the Rhine River and preparations had to be made for the next step . . . the crossing of the Rhine.

We heard about the First Army's big break when the Germans failed to destroy that Ludendorff Bridge that crossed the Rhine at Remagen. This gave the troops all along the line a break too, because we heard later that Hitler rushed his forces from the north to try to stop the First Army. He kinda failed.

So . . . the Ninth Army crossed on March 24, 1945, using alligator tanks under smoke cover and established three bridgeheads north of Duisburg. These were busy days for the 97th. On the 29th, the Battalion CP along with Headquarters Company moved to the vicinity of Brueckhausen. Company "C" went ahead of the Battalion to Friedrichfeld, Germany, then on to Vennemannshaff. Company "B" moved forward with the XVI Corps and set up at Lohberg, Germany. Company "A" moved to a place near Letkampshut, Germany, then on to Recklinhausen, Germany. The 97th Signal Battalion was furnishing communications support on the move these days. Everything seemed to be moving fast.

The First Army had taken a long end run around the Ruhr to Paderborn. Meanwhile the Ninth Army skirted the Ruhr and suddenly shooting its right flank southward, they linked up with the First Army Spearhead. The Ruhr was encircled . . . the greatest encirclement in history . . . with 300,000 Germans inside of it. We were furnishing communications for the XVI Corps whose mission was to help whittle down this Ruhr pocket.

Our armies raced full speed ahead into the German Reich. It was the grand climax for the U. S. Forces and communications had to go in fast. The Ruhr task was completed on April 18th and by 28 April, the Battalion CP, Headquarters and "A" Companies found themselves at Beckum, Germany. Company "C" was located in Herne, seven miles away from the Battalion CP. Company "B" was moving with the XVI Corps forward.

Everybody was a DP. Remember the original non-fraternization rule and the 65-dollar fine . . . if you were caught?

We heard about the First Army linking up with the Russians near Torgay. That news sounded good . . . they were our allies . . . then!

All of a sudden . . . THE WAR WAS OVER, at 0001, 9 May 1945. It gave us a funny kind of feeling inside. All of us began to think more about home and our folks, but our job wasn't over by any means—we never thought so much wire existed to be picked up.

The XVI Corps was given the mission of military government which was turned over to the British on 7 June 1945. A week later the 97th was assigned to General Patton's Third Army, and was on the move again. After a tiresome 459 mile road march, Headquarters, "A" Company, "C" Company and the Medical Detachment arrived at Augsburg, Germany on 23 June 1945. We set up in a field on the outskirts of the city while Company "B" went to Pilsen, Czechoslovakia.

The German people were finding that Hitler had said at least one truthful thing in his bloody career when he said "Sieg oder Chaos." Defeat for them did indeed bring chaos. The Germans met defeat . . . hungry, homeless, and hopeless . . . we also heard about the concentration camps.

Remember the "Schnapps" that suddenly started to appear . . . and the effect it had? There wasn't much time to think and swap tales though, because on the 27th of June we left for Bamberg, Germany where Company "B" rejoined us from Czechoslovakia. The entire battalion set up in a former German cavalry garrison known as Lagarde Kaserne. Our mission was to furnish communications for the XV Corps Area.

We were kept busy with the installation of XV Corps Command Post and the rehabilitation of open wire and underground circuits. Very High Frequency Radio was furnished to the 6th Armored Division and the 26th Infantry Division.

Then they announced the point system and we all sat down and figured out our own!

We Join Constabulary

Signal communications were quieting down to routine garrison installation to divisions being redeployed. Plenty of wire still had to be picked up and lines had to be put in shape again. We waved goodbye again to "A" Company who had to take over the mission of the 28th Signal Heavy Construction Battalion in Munich, Germany. A lot of our old buddies were going fast, because they were leaving for the Good Old United States. New men . . . and plenty green . . . came in to take their places.

We set up pole lines across the Regnitz River, maintained communications for Stars and Stripes, RCA and Press Wireless, put in ten VHF circuits from Altenburg Castle in Bamberg and fur-

(*Continued on page* 74)

From The President

President Halligan points out that we must be careful not to grow lax in our defense efforts, and that the need for strengthening the AFCA is more important than ever before. To that end each member can help signing up new members.

As I write this message to you our military leaders are negotiating a cease-fire peace plan in Korea. It's been a costly year of war in which the need for preparedness has once again been demonstrated.

How long ago it seems and yet how vividly we can recall the attack on Pearl Harbor ten years ago. I remember, too, just seven years ago this month when one of my sons brought home a piece of shrapnel in his right leg. It was six years ago that World War II ended on V-J Day—a never-to-be-forgotten event in American history. Five years ago the Armed Forces Communications Association was organized and incorporated under the laws of the District of Columbia.

In view of present world conditions the need for strengthening our Association is more important than ever. The preamble of the AFCA Constitution clearly points out our aim: ". . . To maintain and improve the cooperation between the Armed Forces and Industry in communications, and in the design, production, maintenance and operation of communications, electronics, and photographic equipment in time of peace as well as in time of war."

In order to assist in achieving our objective each member should take it upon himself to sign up one new member. It's not much to ask and certainly doesn't require the pressure normally connected with membership drives in other organizations.

To me, membership in the AFCA is an honor of which I'm genuinely proud. Let's all take the same pride in our Association and help it grow. Prospective new members are all about us unknowingly awaiting the opportunity which we can make available to them. It's no secret—we want more members!

Whatever the outcome in Korea, we must be careful not to grow lax in our defense efforts. Government production has been accelerated and will continue to play an increasingly important role in the months to come. Civilian production, on the other hand, while currently slow for the summer season, should pick up again in the Fall. A simultaneous flow of Government and civilian production is a good business condition. It requires time and effort. It needs support and cooperation. . . . We as members of the AFCA have our job to do "in time of peace as well as in time of war."

W. J. Halligan

PHOTO CONTEST WINNERS

The photo section, this issue, presents the major winners in the recent AFCA-Signal Corps ROTC photographic contest, including some of the runners-up and data concerning the first winners and the prizes. Top prize, a Kodak Medalist camera, went to ROTC cadet Lester Pfeffer of New York University for the photo above. The winning photo was made with a Rolleiflex camera and an f3.5 Schneider Xenar lens. Setting was 1/25 of a second at f4 for a hand held exposure. Film used was Kodak Plus-X, developed in Ansco Finex, and the print was made on Opal-G developed in Dektol. The scene was lit with photofloods.

Left: Cadet Pfeffer is congratulated on receiving the AFCA's first prize in the ROTC contest by Lt. Col. Ludwig G. Engler, USAR, who, representing the AFCA New York Chapter, made the award at the 28th Command field day exercises in NYU Chapel May 10, 1951.

Right: First prize winner Cadet Lester Pfeffer gave us this background on his photographic activities—"I have used almost every type of camera, but have done most of my good work with the Rolleiflex. In high school I did work for the school paper and the yearbook, having been photo editor for the latter. I entered the monthly contests and took second place in the second annual high school photo salon. That was the first of my contest successes, my biggest of course coming when I took top award in the AFCA-Signal Corps ROTC contest. My photography is no financial burden, as it supports itself. I do photography on a semi-professional level. Baby pictures are my favorites, while I also do interiors and furniture for a decorator. At NYU I am on the newspaper and yearbook staffs and do work for the publicity dept."

Second prize in the AFCA-Signal Corps ROTC photographic contest was awarded to cadet Young Eng of Rutgers University for the above photo entry. In making the photograph Eng used a 2¼ x 3¼ Miniature Speed Graphic with a 200 cm f6.3 Laack Tele-anastigmat lens opened wide, and a shutter speed of 1/10 second. For lighting he used a No. 1 photoflood for main light, a No. 2 fill-in, and a high-light for the hair. Film used was Kodak Super-XX. The picture, says Eng, was taken under the following circumstances. "The Rutgers Photographic Society, of which I was president at the time (1950-51), was holding its first meeting of the year, which was a studio night. A student at New Jersey College for Women, Joan McClean, was obliging enough to model for us. I made a series of eight photos, and of these the one I considered the best I selected for my entry in the AFCA-Signal Corps ROTC contest."

Below: Retiring president, Dr. Robert C. Clothier of Rutgers University, congratulates cadet Young Eng after presenting to him the second prize, a Century Graphic camera, in the AFCA-Signal Corps ROTC photographic contest. Eng, a resident of Long Branch, N. J., and a junior at Rutgers, is on the board of directors of the Raritan Photographic Society and has been president of the Rutgers Photographic Society and of the Long Branch High School Camera Club.

Right: General Prize

By Otto J. Thomas

Oklahoma City, Okla.

Oklahoma A & M College

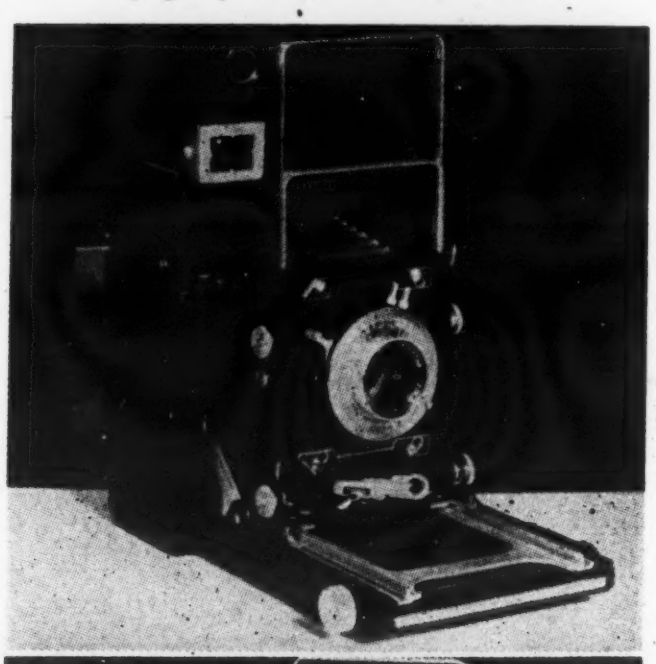
For this photo camera used was 2¼ x 3¼ Miniature Speed Graphic. Setting was f22 for a time exposure of one second, on Isopan film.

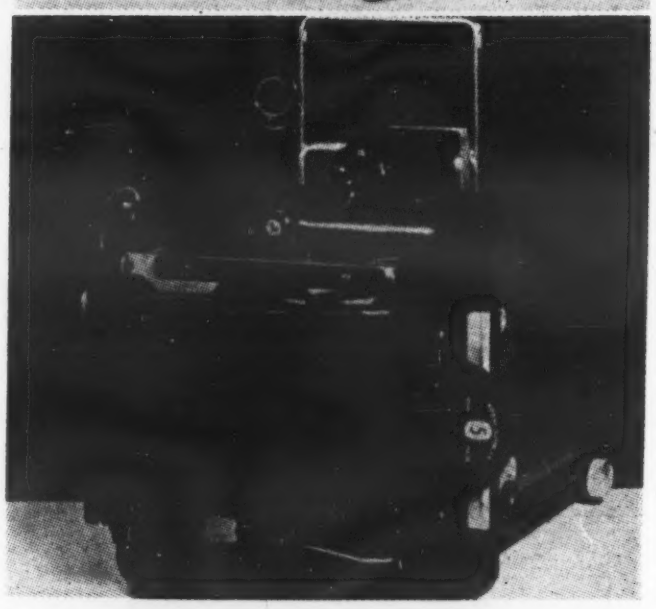
Above: AFCA Executive Secretary George P. Dixon and Major General Kirke B. Lawton, deputy chief signal officer, look over the winners in the AFCA-Signal Corps ROTC photographic contest.

Below: First prize in the AFCA-Signal Corps ROTC photo contest was this Kodak Medalist II camera which with accessory backs can use roll film, sheet film, film packs, or plates. The camera was donated by AFCA industry group member Eastman Kodak Company.

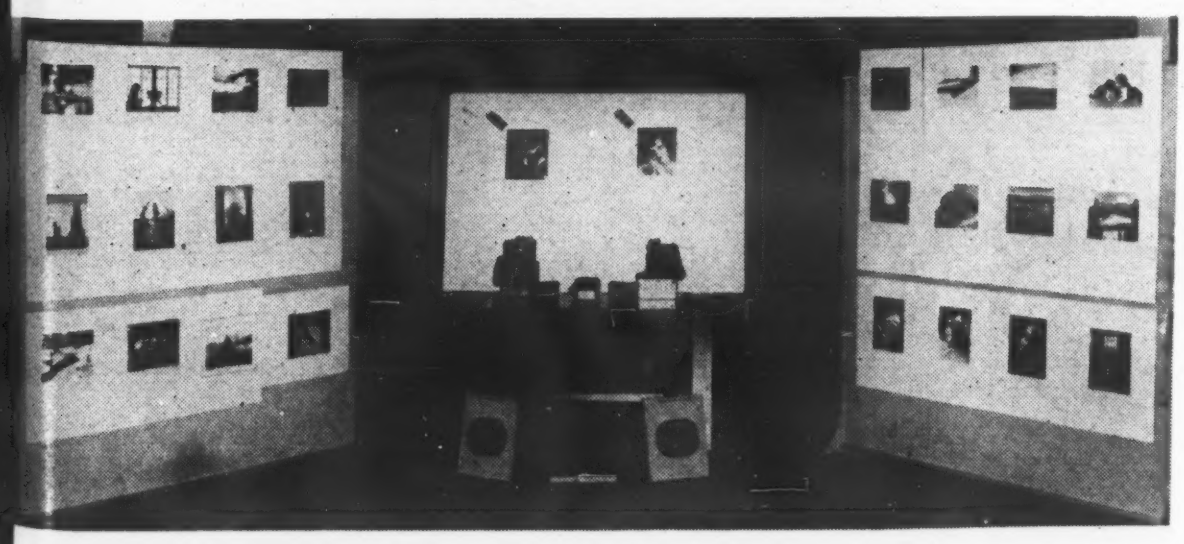
Below: Contest judges in final deliberation on top award. L to R: Wallace R. Fingal, editor, Signal; Commander John H. Levick, USN, chief of still picture branch, office of public information, Department of Defense; Major John S. Bardwell, chief of still picture branch, Army Pictorial Service Division, OCSigO.

Below: This Century Graphic camera was the second prize award in the photo contest. The camera was donated by Graflex, Inc., an industry group member of the AFCA.





Below: Prize winning entries in the AFCA-Signal Corps ROTC photographic contest mounted for display at the Pentagon. The prizes were also displayed, including the general prizes. The latter consisted of 50-sheet packages of 11 x 14 portrait paper, donated by AFCA industry group member The Haloid Company; and half-dozen-roll boxes of Daylight Color Film, 120, donated by AFCA industry group member General Aniline & Film Corp., Ansco Division.



Left: General Prize

Robert D. Mitchell

Pullman, Washington

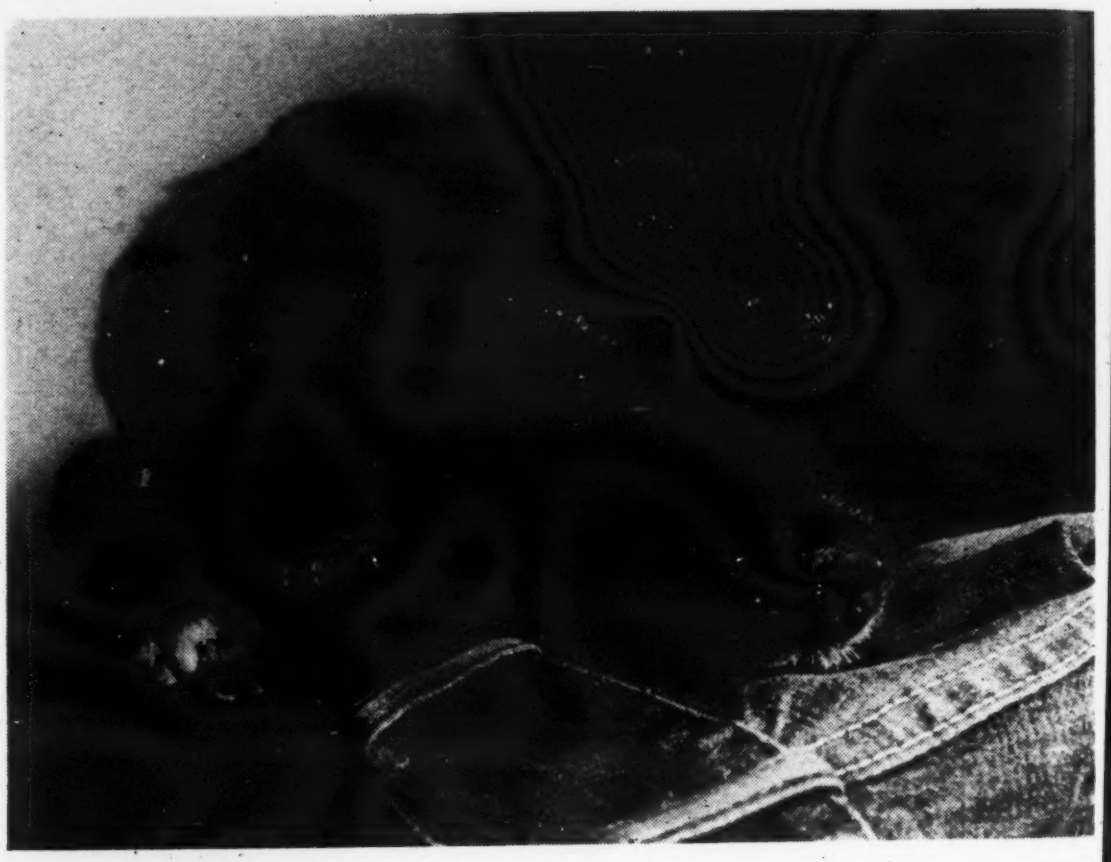
Washington State College

Right: General Prize

Richard M. Clohecy

Chicago, Ill.

University of Illinois



Left: General Prize

Ken Bukowski

University of Alabama

Communications and the

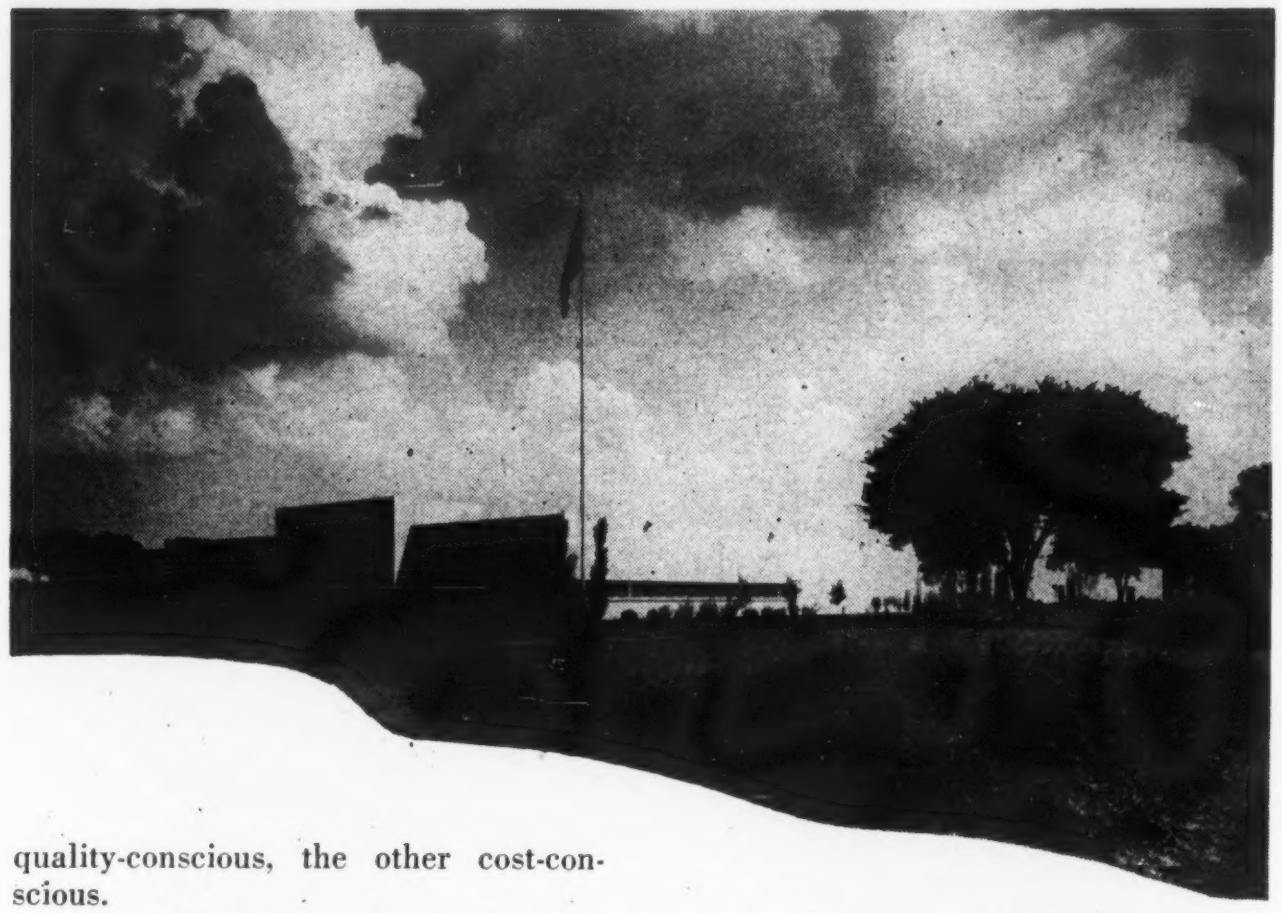
COLLINS RADIO COMPANY

Communications people all over the world are long accustomed to associating the name Collins Radio Company with fine radio equipment. But perhaps because the company's plant is located away from the large industrial centers its products are far better known than are its facilities. For this reason the visitor's first impression of the Collins Radio Company seldom fails to be one of mingled surprise and admiration. This pleasant reaction is explained in part by the company's completely modern and air-conditioned plant housing 2500 people and some of the most advanced laboratory and production facilities in the world.

Collins' entire facilities are devoted to the development and production of specially engineered radio equipment for almost all branches of the Federal government, the radio broadcasting industry, the airlines and other industries employing radio communication, and the radio amateurs. While the amateur does not use radio on a commerical basis, his equipment furnished by Collins meets government and commercial standards, and much of Collins' amateur gear is bought and used for professional purposes.

Largely because of the wide differences in standards between commercial equipment and the radio for the home, the company has never produced for a mass market except during wartime when the military requirements could be classed as such. The high standards of mechanical and electrical design, and excellence of performance required for military and industrial equipment are entirely incompatible with mass production at costs to meet the competition in the home radio and television field. And, being perfectionists, it is unlikely that the people at Collins could willingly accept the compromises required to place their products in this highly competitive market.

There are several other large suppliers of commercial radio equipment competitive to Collins but in this market Collins is unique in that its entire output is commercial. Some of the competitive suppliers are so large that their commercial radio output is but a fraction of their total sales. And within some of these larger companies it is not uncommon to find entire separate divisions devoted exclusively to engineering and production of commercial radio products, attesting to the necessity for two kinds of people, one quality-conscious, the other cost-conscious.



Above: The Collins Radio Company's main plant and general offices at Cedar Rapids, Iowa.

The Collins Radio Company has had a long and rather intimate association with the armed services. During the period of greatest expansion the company was producing, and still is, a very large proportion of its output for the military. While the design and performance characteristics of military radio equipment are not far different from those required by other commercial users, the management, selling, cost accounting and other service practices necessary for getting along with the military customer are rather different than those that would be employed, say, for a commercial airline.

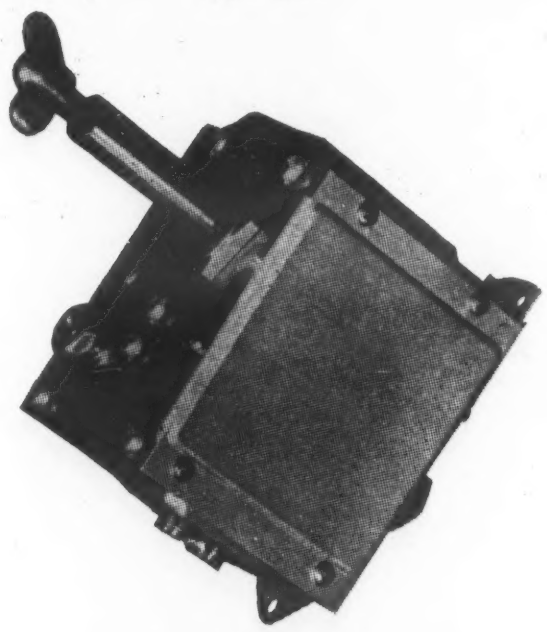
From management down through all departments the Collins Radio Company is organized and operated to make living with the armed services an efficient and pleasant experience. There are countless examples which could be cited to illustrate how well the system works, but for the sake of brevity only a few will be discussed.

The first step in becoming a supplier, of course, is to obtain the order. Compiling data and filing a bid can be an onerous task if done so infrequently that there is no clearly defined understanding of an established procedure, which, in Collins' case, is as follows:

After management has determined that a bid will be submitted, copies of the invitation to bid and specifications of the wanted equipment are forwarded to the company's accounting, engineering, production and legal departments, and to the contract administration group.

A review date, well in advance of the bid deadline, is established and on this

Below: A Collins Autotune head. Several of these heads, all driven by the same motor, form an Autotune system which completely tunes a radio transmitter or receiver to any one of ten pre-set frequency channels, precisely and in a matter of seconds, at the flip of a tap switch or telephone type dial.



date representatives of all departments concerned meet to review the data compiled, and determine the terms of the bid to be submitted. Following this meeting the bid is completed and filed.

This procedure sounds like a thoroughly logical and simple one, and in fact it is. The important features of it are that first, each person concerned understands exactly what is expected of him and second, he provides time in his schedule to accomplish his part in the most thorough manner possible. The military procuring agencies quite properly expect to receive bids responsive in all particulars. This procedure and delegation of responsibilities insures that each element of the bid will receive adequate attention. And it also helps to insure that the term "successful bidder" still applies at the time of final accounting after the contract is completed.

The engineering department has at its disposal practically every known facility for testing electronics equipment, including a small fleet of aircraft. Designs based on empirical data obtained from long previous experiences will suffice in many instances for equipment put to less strenuous use than that to which military equipment is subjected. Also interruption of your favorite TV show due to equipment failure is hardly as consequential as would be the case had your life depended on it, junior's lamentations to the contrary. Another factor is the military's "show-me" attitude and insistence on proof of performance. Performance tests are, of course, conducted by the customer but design would indeed be a laborious undertaking if his were the only test facilities available. With complete facilities at his disposal the Collins engineer can prove or disprove his ideas as they occur, quickly and at minimum expense.

Complete facilities and long experience in designing for the military have inbred a rather startling characteristic in the Collins Engineering Department. It is just automatic that all of their designs, and not always by intent, will conform closely with military requirements. This characteristic is, of course, one of the company's most valued assets but it does occasionally cause a feeling of frustration among those pressing the sale of the company's products to commercial concerns. A buyer's resistence to the almost intangible features of quality of construction and excellence of performance, especially when the competition is offering equipment also suited to the purpose but at a lower cost, sometimes makes the salesman wish that the engineering department hadn't so well benefited from past experience.

In addition to possessing the "know-how" and facilities, the engineering department is organized to produce service, data and other information in forms prescribed by the military. Instead of treating instruction books, manufacturing drawings, progress reports, spare parts list and the like as functions secondary to equipment design, they are treated as equally important requirements of the contract. Subdivisions within the department are assigned the responsibility for these elements of each job, thus relieving the design engineer of much paperwork and insuring that the data will be available when required.

Every successful company can usually attribute its growth and development to one or more unique features such as the type of services it offers, its products or inventions, or something else that distinguishes it from its competitors. An early Collins development in automatic tuning mechanism can be classed as one of the distinguishing features which have had a large part in the company's development. Many of the types of equipment now in production at Collins are direct descendants of the first automatically tuned multi-channel radio equipment.

Above: The Collins 16F ground based high frequency Autotune transmitter has a power output of 300 watts on phone and up to 500 watts on CW.

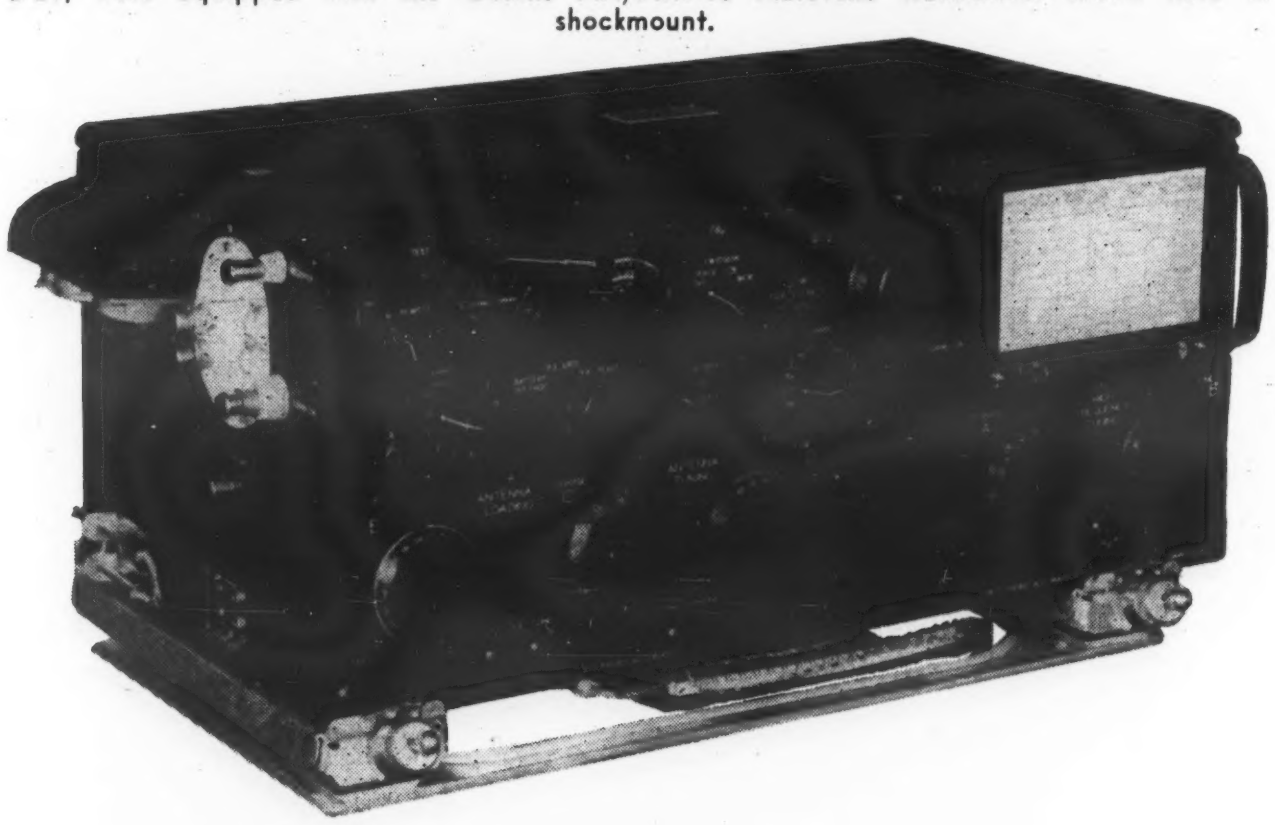
As early as 1937 Braniff Airways and American Airlines were flying the Collins 17D multi-channel, high-frequency transmitter. Even prior to this date, the United Fruit Company had in service a Collins' ground-based, high-frequency transmitter equipped for multi-channel operation. The first multi-channel equipment to become known world wide was the Collins AN/ART-13 aircraft transmitter placed in service by the Navy and Air Force early during the last war.

These transmitters, many still in use, were the first to provide ten pre-set channels instantly selectable over a completely electrical remote control system. The Collins' Autotune,* a mechanical repositioning device of great accuracy, was employed for completely tuning the transmitter. Later this same mechanism made its appearance on the AN/ARC-1 VHF transceiver manufactured for the Navy by the Western Electric Company.

While ten instantly and remotely selectable channels were many more than had heretofore been available, operations people envisioned the day when literally hundreds of channels would be necessary for aircraft communications and other purposes.

Reg. U. S. Pat. Off.

Below: All Navy two-place and larger planes and many Air Force bombers, including the B-29, were equipped with the Collins AN/ART-13 Autotune transmitter shown here in shockmount.



Theoretically an Autotune mechanism of many times ten positions could be constructed, but as the number increased above about twenty, the size and the power required to drive it got out of hand. The logical answer to increasing the usable number of channels then seemed to be in employing two or more mechanisms on a decade basis. For example, two ten position Autotunes used in this fashion would provide 10 x 10 = 100 channels.

A decade system is, however, predicated on a linear relationship between frequency change and tuning mechanism travel. In other words, if the tuning mechanism is advanced in two or more equal increments the resulting frequency changes for each increment must be equal.

While less spectacular than the mechanical intricacies of precision positioning devices, development of linear tuned circuits is a feat in itself. One of the most interesting outgrowths of this single development is the 51J-2 Receiver, pictured below.

Having linear tuned circuits available eliminated the need for the adjustable feature of the Autotune mechanism, thus giving birth to the Autopositioner. This latter mechanism rotates a tuning shaft to a number of precise, equally spaced positions, whereas the Autotune will rotate a tuning shaft to a number of precise positions spaced at random.

"Auto" Mechanisms Wide Use

Collins currently has under production for the armed services several types of communication equipment utilizing the Autotune and Autopositioner mechanisms. Also in production are the 16F-14 and 231D-20 ground-based high-frequency transmitters for long range point-to-point and ground-to-air service. These transmitters, employing the Autotune, are in service throughout the world.

First of the aircraft equipments to use the Autopositioner and linear tuned circuit developments is the Collins 51R VHF navigation-communication receiver. Almost everyone in the aviation industry is familiar with this set and it is now in regular use by most of the scheduled airlines. The pilot has at his fingertips 280 crystal-controlled channels for the reception of localizer and omni-range signals and for communication. Only thirty-four crystals, permanently installed in the set and switched on a decade basis by an Autopositioner, are required for all 230 channels. Selection of channels is easily and positively accomplished by means of two rotary tap switches with associated dials reading direct in megacycles.

Above: The 17L transmitter and 51R receiver shown in dual shockmount for use in aircraft. Together they furnish two-way VHF voice communication. The 51R also provides reception of omnirange signals for navigation.

Next in line of commercial equipment is the 17L-2 VHF transmitter, companion to the 51R receiver. This set transmits up to ten watts of power (voice or MCW modulated) on any of 180 crystal-controlled channels. The same autopositioner and linear circuit principles and the crystal saving scheme of the 51R receiver are employed in this unit. Frequency selection is also equally simple and positive.

For the Air Force and the Navy Department Collins is producing both ground based and aircraft communications equipment for use in the ultra high frequency range. Again in these equipments the principles and designs described above are employed to provide hundreds of channels selectable instantly over completely electrical remote control systems.

While the ratio of government to non-government business at Collins continues to rise, the company is determined to advance its position in the latter market also. For the past several years it has held the lead in aircraft radio equipment supplied the airlines and has furnished a very respectable part of all other types of radio communications equipment required by non-government users. Both AM and FM broadcast equipment continues to account for a large volume of business despite the increasing spread of television.

In other than government-sponsored developments the engineering and research departments are engaged in pursuing new ideas for aids to air navigation and automatic flight control. Results of this work are becoming increasingly apparent as new developments are introduced to the aviation industry. A current development now undergoing extensive tests by airlines as well as the Air Force and Navy is the steering computer, a device for greatly simplifying ILS approach flying.

Collins has a major part in the armed services rearmament programs, attested to in perhaps a small way by the military aircraft parked in front of our hangar and the uniformed visitors at the reception desk.

Below: The Collins 51J rack-mounting communication receiver provides continuous frequency coverage from .5 to 30.5 megacycles.

COMMUNICATIONS-ELECTRONICS SUPERIORITY

By Lt. Colonel Philip A. Gugliotta

Chief, Electronics Production Branch
Directorate of Procurement and Engineering
Headquarters, U.S. Air Force

The nation or allies lacking superiority in communication-electronics equipment and technique within their armed forces will lose a future war.

On the other hand, superiority in the communications-electronics field alone cannot win a war. No one technical or strategic superiority can win a war by itself. This philosophy was recently reiterated by our Air Force Chief of Staff regarding air superiority.

During World War II the general public heard very little about the part that communications-electronics played in making air missions successful, in winning individual battles and finally in winning the war. The magic word "radar" was treated as ultra top secret. Occasionally, inference could be read between the lines when headlines stated that a bombing mission was carried out successfully at high altitudes through overcast skies. How else could that have been accomplished without some magic miraculous formula. That formula was communications-electronics equipment and technique.

During the latter part of World War II and continuing feverishly up to the present, no stone has been left unturned in the application of technological know-how, skill, and ingenuity in the improvement of World War II vintage of communications-electronics, and the development of new applications for magic formulas. At times we think that perhaps we are improving and developing too fast for our operating and maintenance personnel to keep abreast of the "state of the art" in the communications-electronics field.

Now that "it can be told," let us take a cursory glance at the part that our communications-electronics technology plays in the Air Force.

Until such time as we can depend solely on radio and radar controlled aircraft, piloted aircraft will continue to be the basic unit of the Air Force. Obviously, to be effective aircraft must fly. An aircraft on the ground is an expensive and useless "piece of gear." Further, we must be able to fly that aircraft when and wherever required to accomplish a military mission.

Considering the strategic bombardment mission of the Air Force let us assume that we have strategic bombers that can fly the required range at a desired speed and carry a "crippling" payload of bombs from available air bases. These aircraft must be employed effectively and economically on operational missions.

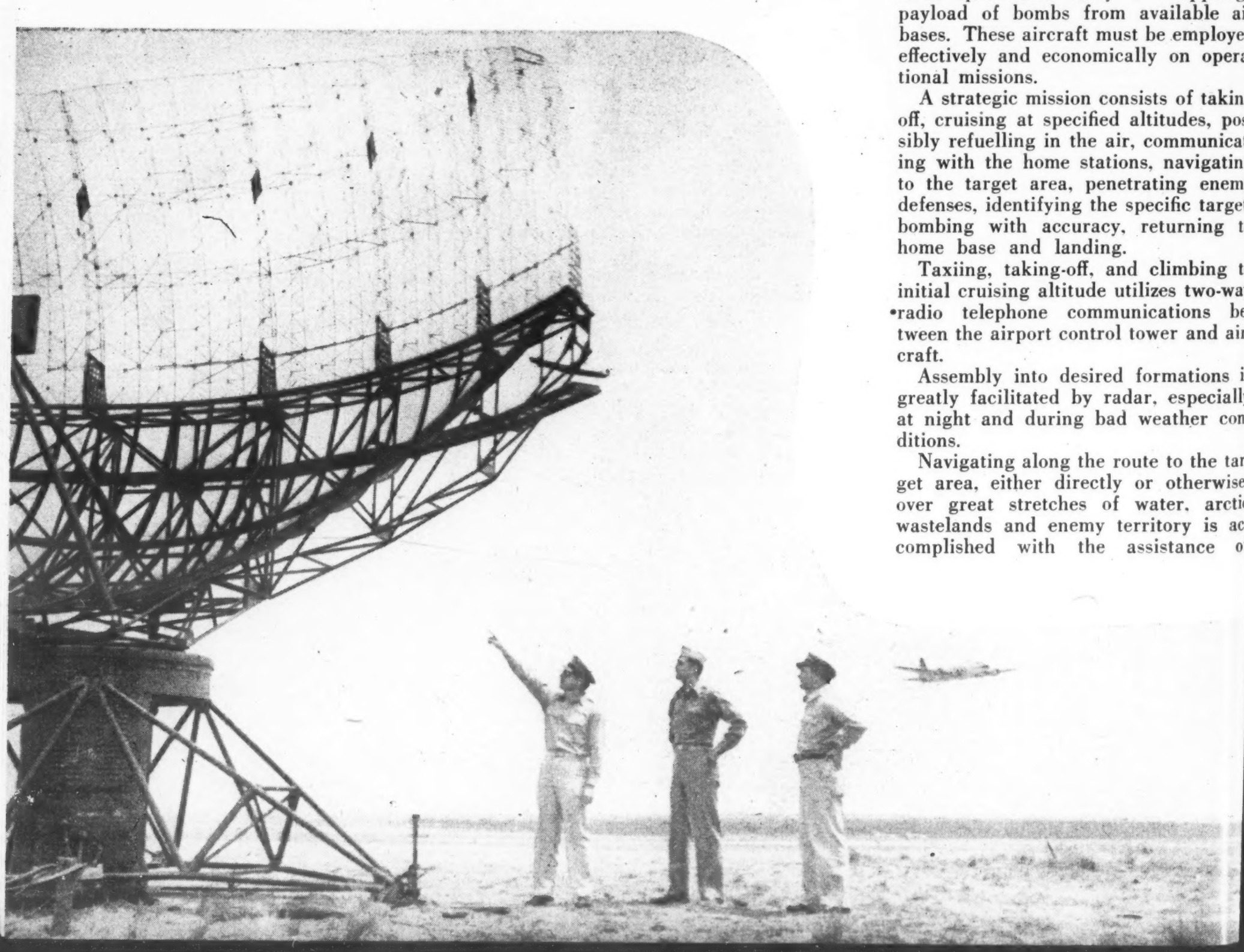
A strategic mission consists of taking off, cruising at specified altitudes, possibly refuelling in the air, communicating with the home stations, navigating to the target area, penetrating enemy defenses, identifying the specific target, bombing with accuracy, returning to home base and landing.

Taxiing, taking-off, and climbing to initial cruising altitude utilizes two-way radio telephone communications between the airport control tower and aircraft.

Assembly into desired formations is greatly facilitated by radar, especially at night and during bad weather conditions.

Navigating along the route to the target area, either directly or otherwise, over great stretches of water, arctic wastelands and enemy territory is accomplished with the assistance of

Below: CPS-5, en route surveillance radar—80 to 100 mile range—antenna.



ground and airborne navigational devices, such as beacons, loran and other radar equipment.

As for refuelling, the rendezvous between the bomb carrier and the tanker is made possible for air-to-air homing beacons or automatic direction finding equipment. The pin-point positioning for gasoline transfer at night or during difficult weather conditions is made possible by the use of radar.

During the flight the pilot must be able to receive instructions or change of plans from his home station. For this purpose his aircraft must be equipped with long range communications equipment. If the aircraft is of such a configuration that it does not have room for the "payload" and a radio operator the equipment must permit automatic receiving and transmission by the pilot.

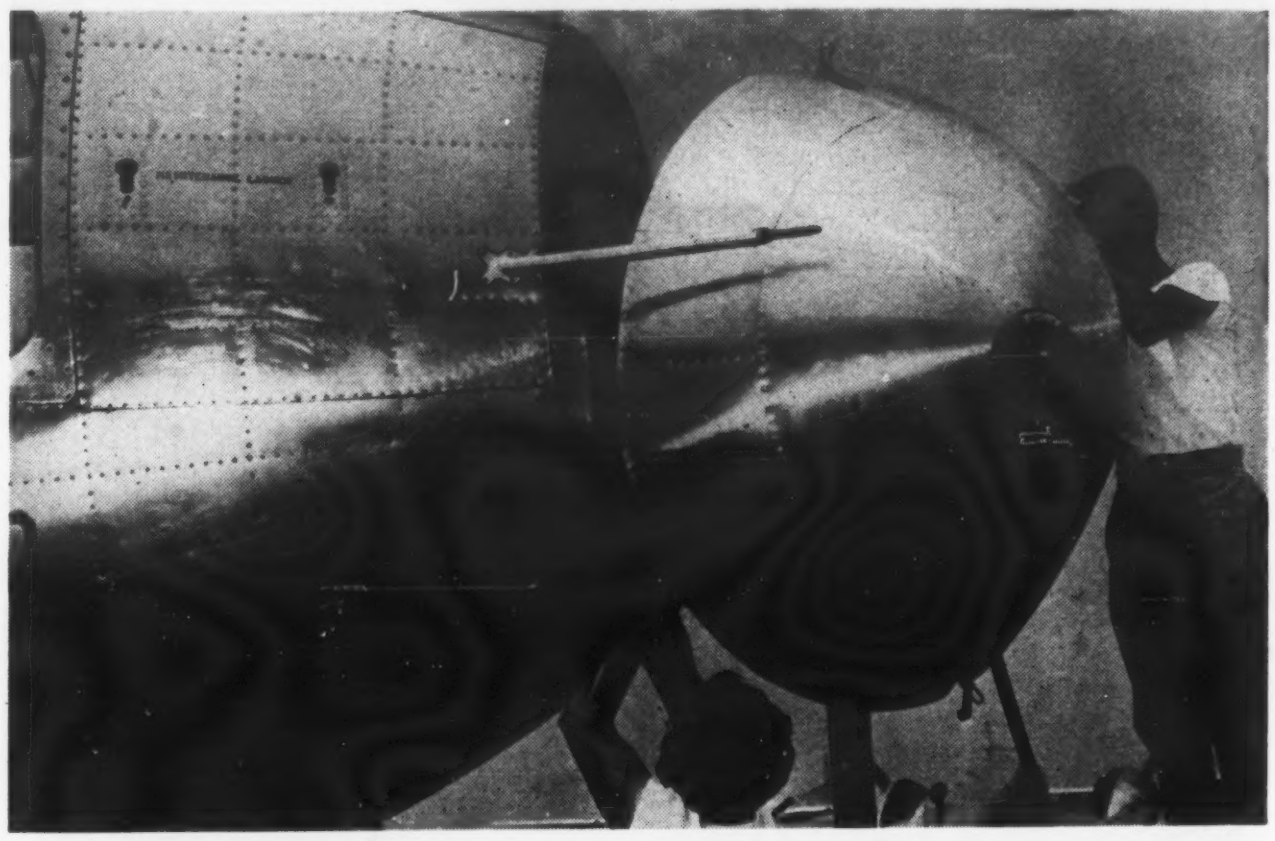
Experience has taught us never to underestimate the enemy, therefore, the bomber may expect to encounter all types of air defense systems during its penetration into enemy territory. These air defenses are designed to shoot down attacking aircraft by radar controlled weapons on the ground or radar-equipped fighter aircraft in the air.

Successful penetration of these defenses is made possible by the use of radar jamming devices capable of neutralizing the accuracy and effectivity of the radar defense systems. If the enemy fighters succeed in spotting the attacking bomber, the bomber must employ radar fire control systems capable of seeing the enemy fighter, locking its guns on it, and effecting a "kill."

Reaching the target area and then finding and identifying the specific strategic target is the "pay-off." Optical bombsights have limitations inherent in all optical instruments and the human eye. Radar bombing equipment is the only efficient substitute today. New radar bombsights can draw a bead on the target throughout the most violent evasive action. A pilot can zigzag all over the sky and his bombardier still can pinpoint the objective.

Navigating back to the home base area is substantially the same as the trip to the target area. However, a tired crew with an aircraft with near empty gas tanks might be in a hurry to land. If bad weather conditions prevail over the home station and a number of aircraft are to be landed in a short period of time, communication-electronic facilities must get into the act again. Modern automatic radar landing systems on the ground might bring the aircraft down totally by electronics or man-operated radar ground controlled approach systems can "talk" the pilot down through the overcast and dense traffic.

In strategic operations the role of communications-electronics clearly spells the difference between success and failure. The same can safely be said relative to the other functions and missions of the Air Force; namely—air defense, tactical air support of ground troops, air transport, and troop carrier operations.



Above: Flight mechanics attach nose cap to Fairchild C-119 Flying Boxcar, in the center of which is the new installation of glide path antenna. Part of the plane's instrument landing system, the antenna is installed on the interior with a plastic eye covering flush with the nose cap. ILS is one of many navigational devices carried in Air Force craft to help them down to safe landings. Fully automatic radar landing systems are predicted.

Without a detailed analysis of these latter missions, a few of the vital communication-electronic equipments employed are those to search, control and intercept aircrafts for identification of friendly or unfriendly aircraft, for control and coordination of close support operations, for ground and air rescue operations, and for global command control of Air Force organizations.

From the foregoing one might be led to think that an aircraft must consist of a fuselage and wings wrapped around numerous radio and radar "black bones" capable of performing miracles.

Certain aircraft are just that—if only the cost of equipment is considered. In some airplanes the cost of communication electronic devices and instruments almost equals the cost of the other components, engines and structure combined. Small aircraft, such as jet fighters are only equipped with the minimum bare essential electronic equipment, but only due to space limitations.

Convinced or persuaded as you may be that communications-electronics superiority will play a decisive role in preventing or winning a future war, you might ask "What are the armed forces and industry doing to provide us with the mostest and the bestest at the fastest rate?"

Our Commander-in-Chief himself spelled out the urgency and magnitude of this problem in his grim speech of December 15th 1950 when he said, "Within one year, the rate of production of electronics equipment for defense will have multiplied 4½ times."

The armed forces in planning for an Army with umpteen divisions, a Navy with additional ships afloat, and an Air Force composed of 95 to 100 Wings are currently revising their total qualitative and quantitative requirements for communications-electronics equipment. In turn, these requirements are being made known to industry in an accelerated fashion since they will have to be fulfilled at an accelerated rate.

Shortly after the President's declaration of a national emergency, mobilization of the communications-electronics industry stopped walking and broke into a run. The transition period that it will take this industry to change from the manufacture of civilian radio and television equipment to that of complex and rugged military equipment will not be an easy one.

The two major factors confronting industry are engineering "know-how" and manufacture of special components peculiar to the military equipment. The average civilian radio and television set includes in its cost approximately three percent for engineering and twenty-five percent for special parts and components. Whereas, the average rugged and somewhat complex military equipment requires nine percent for engineering and fifty-one percent for special parts and components.

Without the least shadow of doubt, industry is capable and will cope with these and any other problems confronting it. Its irreproachable ingenuity was proven during the last war and individually and collectively they will prove it again.

With the ingenuity of industry to manufacture and the armed forces to effectively employ communications-electronics equipment thereby attaining superiority in this field, it can justly be reiterated that any future war can be won or even averted.

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Sherron Electronics

Virtually every company manufacturing electronic tubes has been supplied with a good portion of its test equipment by the Sherron Electronics Company. Specializing in the design and construction of such equipment, Sherron Electronics produces in its plant test equipments ranging in size from small portable units to those requiring a freight car for shipment. The Sherron plant occupies a modern industrial building of 75,000 square feet, fully equipped (as outlined below) to handle production of custom built or specially designed items. Among these are special cabinets, boxes, consoles (See Figure 1.), weldments, precision mechanical and electro-mechanical devices, electronic control equipment, test equipment, and electronic instruments. Over the years Sherron has supplied these items to the radio, telegraph, and telephone industry. During the last war several million dollars of subcontract work which included electronic and electro-mechanical test equipment of many types and kinds, electro-mechanical prototypes, etc., were built.

Some of these equipments are pictured on these pages. Figure 2 shows a large factory test set used to test cathode ray tubes. Depicted in Figure 3 is another piece of test equipment containing many thousand connections and designed to effectively automatically test a precision electronic device. In Figure 4 is seen still another recent piece of test equipment designed and built for a continuous operation handling many thousand parts per day. A portion of a Sherron manufacturing production line is shown in Figure 5. And Figure 6 shows another large piece of laboratory test equipment completely designed and built in the Sherron shops.

The Sherron organization incorporated in 1934 consists of three integrated

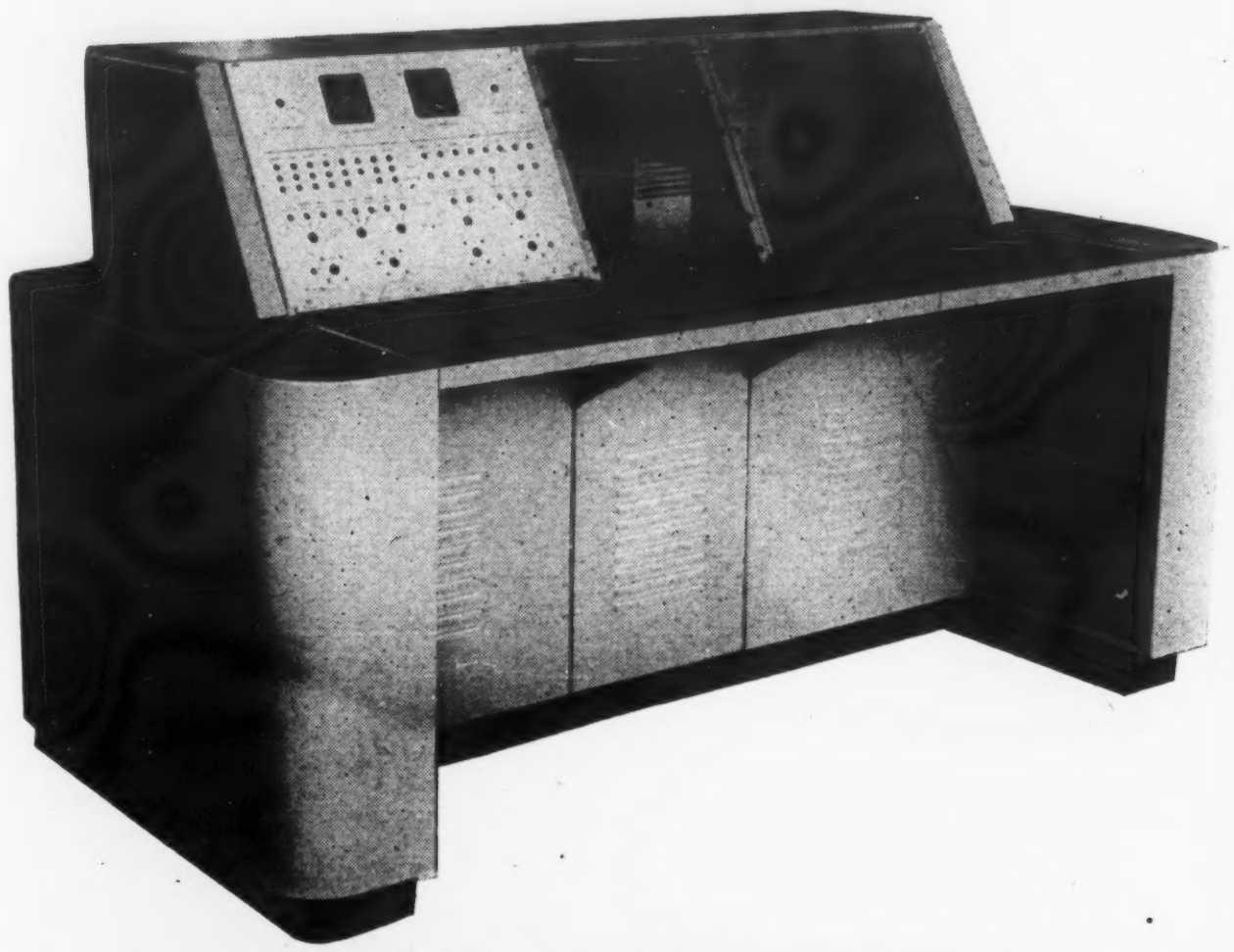


Fig. 1, above: Special console developed by Sherron.
Fig. 2, below: Large factory test equipment for testing cathode ray tubes.

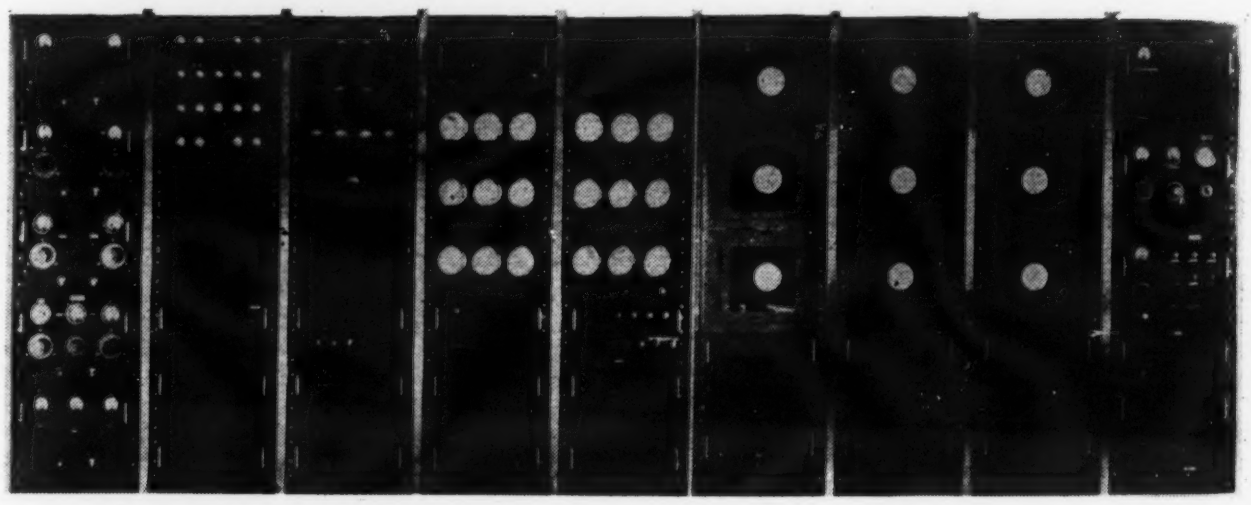
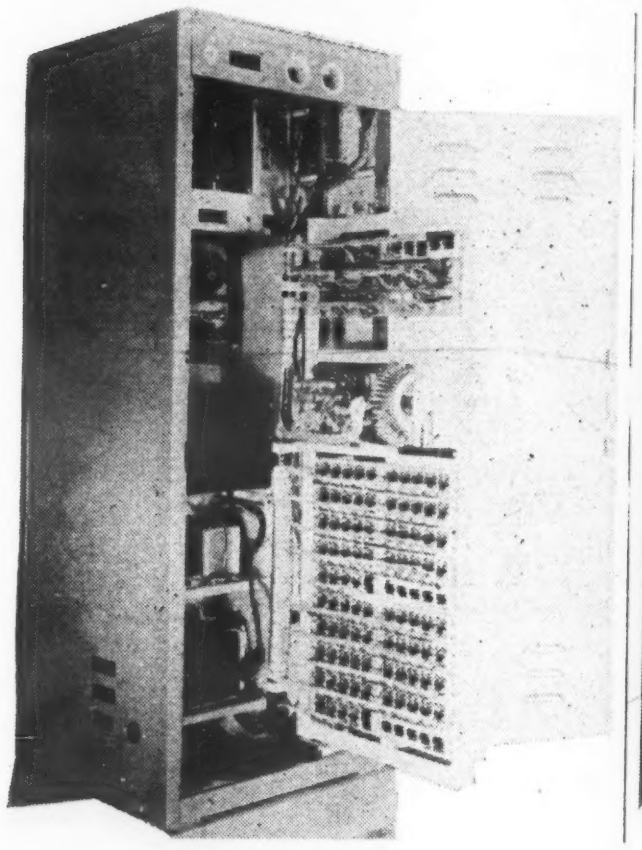
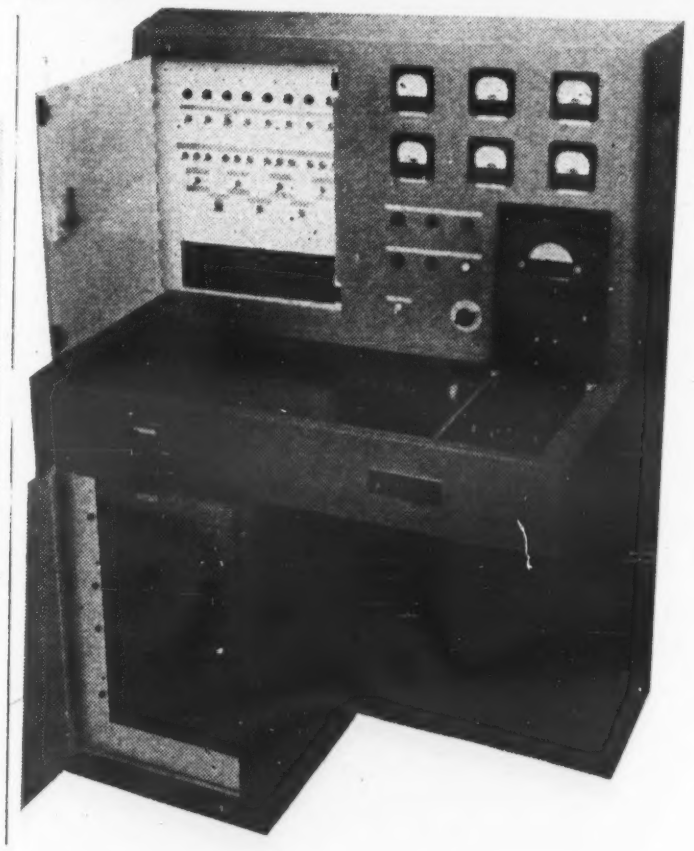


Fig. 3, below, left: Equipment designed to automatically test a precision electronic device.
Fig. 4, right: Test equipment designed for a continuous operation handling many thousand parts per day.





divisions: 1—sheet metal; 2—electronics; 3—electro-mechanical. While all three may be, and often are coordinated for the complete production of electronic equipment, each is set to function separately. A staff of competent electronic and mechanical engineers with a know-how and experience over years serve the plant's technical requirement.

In the lower level of the plant are large power brakes, power shears, power presses and power rolls for forming sheet metal up to ¼-inch thickness. The first floor houses the sheet metal assembly department and welding section plus a battery of spot welders from 15 KVA to 150 KVA, complete with timers and automatic controls. Approximately thirty arc welders from 100 to 300 amps are also included.

The welding department is also equipped with Argon sets for welding of aluminum, magnesium, and stainless steel. Overhead handling equip-

ment facilitates shifting of large units from one section of the plant to another. A railroad siding directly into the building is equipped with overhead handling apparatus for loading and unloading.

The second floor is devoted to the general offices, engineering departments, electronics laboratory, and precision mechanical laboratory. The production areas for wiring of electronic and electrical devices are also located here, complete with full power facilities and testing areas equipped with the necessary instruments and power requirements for testing from D.C. to the microwave region.

The electronic laboratory (Figure 7) is prepared to develop and provide the electronic engineering required for prototypes and preliminary "bread board" work. The electro-mechanical laboratory serves in the design, development, and manufacture of high precision prototypes of mechanical devices, such as special waveguides, servo systems, mechanical controls, and special mechanical devices. This department is staffed by expert mechanical engineers and skilled machine builders with many years of industrial experience. Working spaces, completely air-conditioned, plus modern strip lighting provide an atmosphere that is conducive to high precision workmanship.

The production portion of the third floor is devoted to the finishing department. This department has washing and degreasing facilities, as well as four large spray booths and two large gas-fired automatic ovens. An overhead conveyor carries parts through the finishing operations to the ovens and from there to the final assembly.

The third floor also contains an air-conditioned television studio. This station, experimental in nature, is licensed by the FCC for the purpose of conducting research in, and development of, television techniques.

Fig. 5, above: A Sherron manufacturing production line.

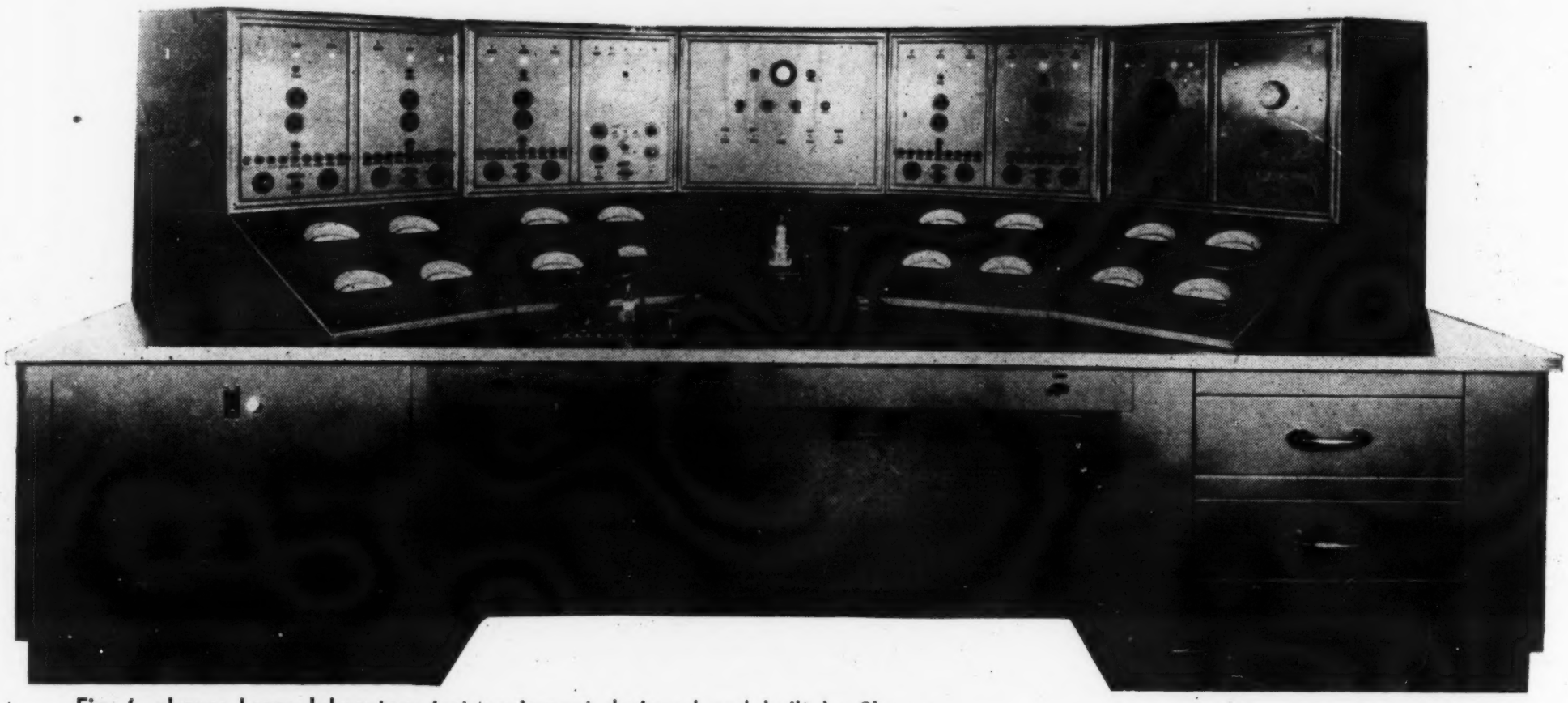


Fig. 6, above: Large laboratory test equipment designed and built by Sherron.

Fig. 7, below: Portion of electronic laboratory which provides engineering required for prototypes.

Radiological Defense Training in the Navy

By Hyman Olken
Training Division, Bureau of Naval Personnel

The Atomic Defense Set-up

The atom bomb dropped on Hiroshima did more than just reveal to the world the enormous destructive power of this new weapon. It gave an inkling of how a nation or society would have to be organized to cope with this new destructive force; and, in addition, it gave a clue to the nature and enormous extent of the new training burden thrown on the Armed Services if they were to cope successfully with this new agency of warfare.

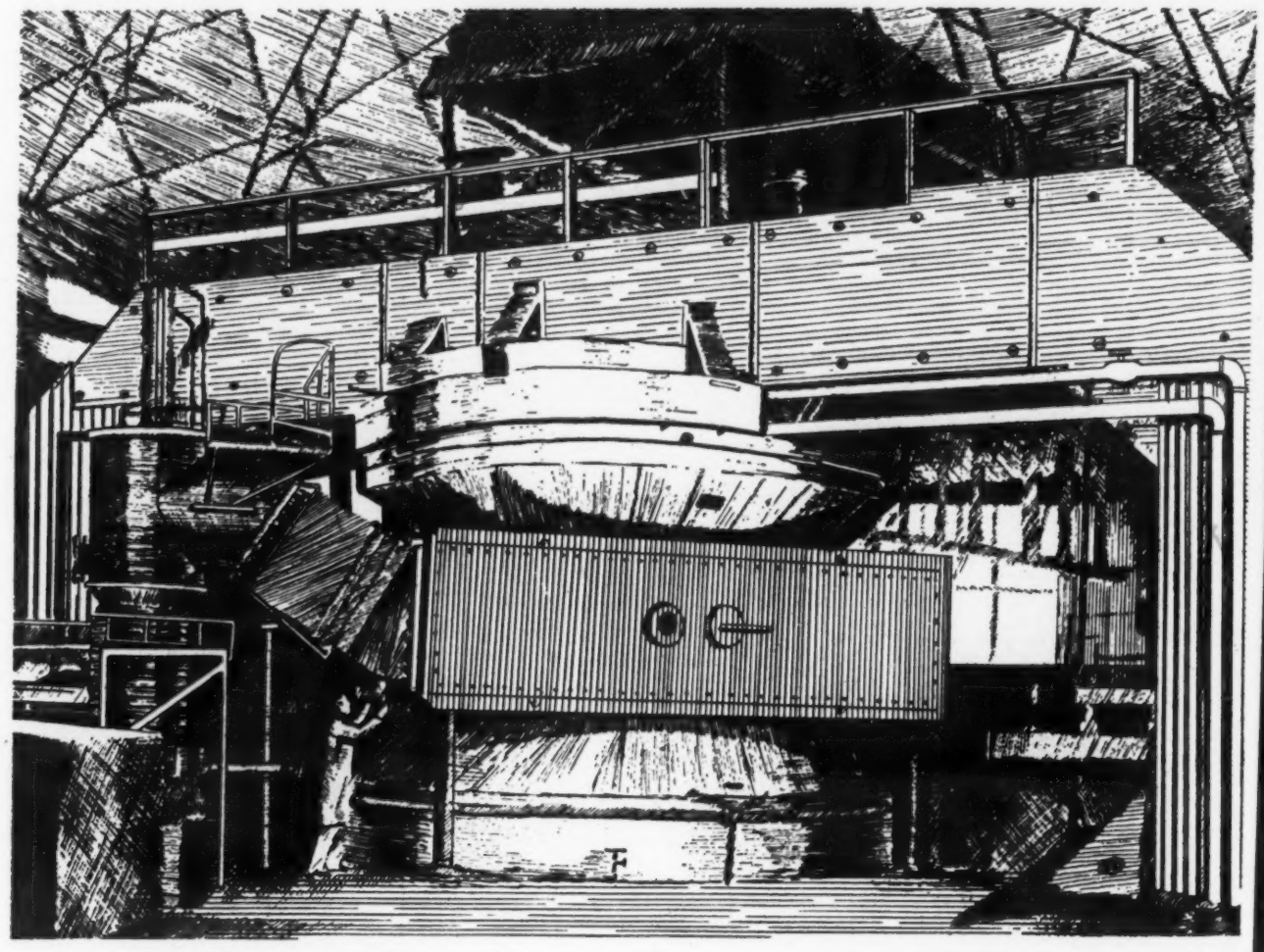
The measures set up to organize the nation for the new atomic age were embodied in the Atomic Energy Act of 1946. This act also established the Atomic Energy Commission (AEC) as the agency to implement these measures. For the military, the agency which evolved was the Armed Forces Special Weapons Project. Since all measures involved in radiological defense training stem basically from these two agencies, a proper perspective of the entire radiological training program in the Armed Services requires that we first glance at the structure and function of these two bodies.

The Atomic Energy Commission. The Atomic Energy Commission is the government agency established by Act of Congress (Atomic Energy Act of 1946) to take over the government's earlier atomic energy activities conducted by the Manhattan Engineer District and to control all future activities of the nation in the atomic energy field. Broadly stated it is the function of the Atomic Energy Commission to conduct the development and utilization of atomic energy so as to assure the common defense and security, improve the public welfare, and increase the standard of living. These general objectives are to be carried out by the following "Specific Programs";

1. To conduct and promote scientific research in both industrial and military phases of atomic energy.

2. To effect government control of the production, ownership, and use of fissionable material; to insure the common defense and security; and to insure the broadest exploitation of these fields.

3. To keep Congress currently informed so it can legislate on matters in the atomic energy field.



The execution of these programs is effected by the following Divisions of the Atomic Energy Commission: Research, Production, Engineering, Military Application, Reactor Development, and the Division of Biology and Medicine.

The AEC organizational structure is as follows: The commission is composed of five members, one designated as chairman, all appointed by the President, by and with the advice and consent of the Senate. The commissioners confer and act as a body on important matters of policy, program, and administration. The general manager, similarly appointed and confirmed, is the principal executive and administrative officer of the commission. He is responsible to the commission for the formulation of policies and programs by the commission's six divisions.

AEC Designates Committees

The Atomic Energy Act provides for three permanent committees: The general advisory committee, composed of nine members appointed from civilian life by the President, advises the commission on scientific and technical matters relating to materials, production, research, and development. The military liaison committee consists of representatives of the Department of Defense and at present has seven members. The commission advises and consults with the military liaison committee on all atomic energy matters which the committee deems relate to military appli-

cations, including the development, manufacture, use, and storage of bombs, the allocation of fissionable material for military research, and the control of information relating to the manufacture of utilization of atomic weapons. The Joint Committee on Atomic Energy, composed of nine members of the Senate and nine members of the House of Representatives, makes continuing studies to keep Congress informed of the work of the Atomic Energy Commission and of problems relating to the development, use, and control of atomic energy.

AFSWP Responsibilities

Armed Forces Special Weapons Project. Military activities in the atomic energy field were initially under the direction of the Joint Cross Roads Committee of the Joint Chiefs of Staff. After Bikini this committee's work was taken over by a permanent organization called the Armed Forces Special Weapons Project. This project was organized to assume responsibility for all military service functions of the Manhattan Project under the control of the armed forces. This includes training of special personnel, military participation in the development of atomic weapons of all types (in accordance with the AEC), technical training of bomb commanders and weaponeers, and the coordination (through established agencies) of radiological defense measures of the armed forces.

The military liaison committee mentioned above is the connecting link for the Atomic Energy Commission, The Armed Forces Special Weapons Project, and the chiefs of staff. This committee is responsible specifically for keeping the military establishment informed of any development in atomic energy that may be useful to it and for keeping the Atomic Energy Commission informed of the needs of the military services.

Summary. The over-all picture of the control of atomic energy activities, particularly in the military field, can be summarized by the organization chart.

Navy Radiological Training Set-up

Authorization. A directive from the Chief of Naval Operations issued in 1946 (and modified in 1947) indicated the specific phases of radiological defense for which each bureau in the Navy is responsible. These responsibilities are indicated in Table I, page 27.

Each of the bureaus has set up training and other activities to meet responsibilities assigned to it by this directive. Radiological defense training by operational commands was organized by separate directives to the fleets, resulting in fleet radiological training activities. Training in atomic weapons is the responsibility of, and is conducted for all three branches of the armed services by, the Armed Forces Special Weapons Project.

Initial Concept of Radiological Defense Training

Soon after Operations Crossroads (1946), the Bureau of Naval Personnel appointed a committee to study radiological defense training. The concepts underlying training for radiological defense were first formulated by this committee as follows:

1. The multiple combined effects of atomic bombs (blast, fire, and radiation) form simply one more type of damage which naval ships and shore stations must be organized to receive and combat and still continue to function.

2. The most important Navy targets for an enemy attack of this type are considered strategic parts of the shore establishment. The attacked area is subject to simultaneous fire, flood, blast, and severe radiological hazards, all resulting in high personnel casualty rate with consequent disruption of emergency organizations.

3. The damage control organizations in ships and on shore stations should be charged with the responsibility of insuring that the action necessary to nullify this type of damage is taken.

On the basis of these concepts, the committee recommended the following personnel categories and billets to meet the Navy's requirements for radiological defense:

1. *Radiological Defense Engineers.* These officers must be prepared to serve on base, district, military, and task force staffs to advise the command and to organize measures at this command level. These safety engineers must have broad organizational ability; also thorough knowledge of (1) the implications of an atomic missile attack on a fleet or base, and (2) the necessary steps to take to minimize and localize the results of the attack.

2. *Radiological Defense Officers.* Damage control parties of all ships will require one or more of these officers, and base organizations will need them in proportion to the number of personnel attached. The radiological defense officer will administer the activity of the meter operators and decontamination personnel, will furnish estimates of radiological contamination throughout the command and in the adjacent air and water, and will recommend courses of action to the immediate command.

3. *Radiological Monitors.* Certain enlisted men (and civilians for shore bases), to be known as radiological monitors, must be trained to use indicators and meters such as Geiger counters, and dosimeters after attack, to detect contamination of areas in their unit and to determine degree of presence of after-effects. They should be trained as general damage control personnel and, in addition, should be qualified to act effectively in decontamination processes against radiological after-effects of attack by atomic weapons.

4. *Radiological Maintenance Personnel.* Personnel must be available who can repair and maintain the instruments involved.

5. *Medical Personnel.* Medical personnel will be required to carry out extensive first aid measures of the types required by atomic missile casualties. In addition, medical laboratory technicians and photometry dosimetrists also will be required to carry out medical tests required by the radiological defense program.

The above categories have since been closely paralleled by both the Army and Air Force. A complete definition of radiological personnel in all three branches of the armed services is given in the "Final Report" of the Joint Radiological Safety Training Committee to the Joint Chiefs of Staff.

Current Philosophy of Radiological Defense Training

The philosophy to be followed in radiological defense training was thoroughly studied later by a committee of the Armed Forces Special Weapons Project appointed at the request of, and reporting to, the Joint Chiefs of Staff. This committee, called the Joint Radiological Safety Training Committee, in its final report (1947) firmed up the philosophy underlying current radiological defense training in all three branches of the armed services.

Generally, this report recommends that the armed services follow a pattern of radiological personnel categories and billets similar to that recommended by the Bureau of Naval Personnel committee for the Navy as noted in the paragraph above. On the basis of this billet pattern, some of the major underlying ideas for radiological defense training recommended by the joint radiological committee are:

1. *Joint Training.* Common defense of the zone of interior, in virtue of the cataclysmic possibilities of atomic warfare, may require coordinated work by the Army, Navy, Air Force, and civilian population. It is therefore considered that the basic training in certain levels should be joint training even though the position assignment within the services need have no close correlation. This will insure that, in emergency, personnel from any and all of the services may be called to work together with civilian defenders, and that they will have a common education, speak a common professional language, and use similar equipment with similar procedures.

2. *Levels of Training.* The principle of joint training indicated above required the establishment of certain broad levels of training common to all three services. These broad levels of training may be broken down into groups or subdivisions to fit the posi-

tion requirements of the individual services. These training levels are:

(a) Basic Indoctrination
(b) Technical Training
(c) Advanced Education

It is considered that the principle of joint training within these major classes should be implemented along the lines set forth in the following paragraphs.

(a) *Basic Indoctrination.* Every service man, and at a later date every civilian, should be taught certain fundamentals of radiological defense which will better fit him for survival in radioactive areas. A joint agency should be responsible for formulating the basic doctrine to be taught in this level, and the teaching of this doctrine should be implemented by the services. This basic doctrine should be graduated in accordance with position.

(b) *Technical Training.* An operational group engaged in radiological defense work, in addition to officer leadership, will necessarily include medical and nonmedical personnel, monitors, laboratory personnel and equipment, and maintenance personnel. Under emergency conditions, available personnel from any service may be utilized and required to work in close cooperation with personnel of other services. For that reason, it is desirable that technical training be aligned among the services, and that it be adequate not only for the needs of the services but for armed service support of civil defense. To assure this, it is considered that a joint agency should standardize the curricula for such personnel. It is concluded that this function is within the meaning of the Armed Forces Special Weapons Project charter.

(c) *Advanced Training.* A requirement exists for officers to function in staff position and duties wherein they must provide authoritative and reliable advice to their commanders, formulate long-range plans, administer radiological defense organizations in a large and complex military organization, and frequently represent their commanders in coordinating with civilian experts and scientific groups. A parallel requirement exists for medical, advisory and planning staff positions in headquarters of large military commands and large medical installations. These officers should be jointly trained in the best courses available in service and civilian universities in order that they may function in the missions assigned to these positions. In the case of the nonmedical officer, this training must take the form of postgraduate education to a master of science degree level, and in the case of the medical officer, similar postgraduate specialization in appropriate studies for a minimum of one academic year. Since this is a long-term program in which the needs of the various services, the civilian public, and the atomic industry are related, a joint agency should have supervision of the conduct of a training program of this nature.

Navy Radiological Defense Courses

To conserve the knowledge and experience gained by the Bikini (Cross-Roads) operation, the command of Joint Task Force One immediately after Bikini held a four and one-half week's course to train radiological defense officers. The course was held at the Navy Department Building in Washington, D. C., and was a joint service activity, attended by officers of the Army, Navy, and Air Force (then army Air Corps). Guided by the experience gained in this course, the Navy's Bureau of Medicine and Surgery and Bureau of Naval Personnel, soon established radiological defense courses.

Courses in radiological defense have since been established by the bureaus and other activities of the Navy to meet their assigned responsibilities in this area of warfare. Particulars of the more prominent courses are given in the succeeding paragraphs.

Bureau of Naval Personnel

The training division of the Bureau of Naval Personnel, soon after the first course, set up a permanent six-week course for training of radiological defense officers at Treasure Island. Since the basic philosophy in Navy radiological defense training was to consider radiological defense as another phase of damage control, this course was set up at the Naval Damage Control Training Center at Treasure Island (San Francisco), and an identical course, conducted by the Army, was set up shortly afterward in the Army Chemical School at Edgewood, Maryland. Later a corresponding six-weeks radiological defense course was set up by the Air Force at Keesler Air Force Base, in Biloxi, Mississippi. All three courses are operated on a joint basis, to permit personnel of all three services to attend the one they are nearest to. Thus, personnel of Army, Navy, or Air Force nearest the Gulf Coast attend the course at Keesler.

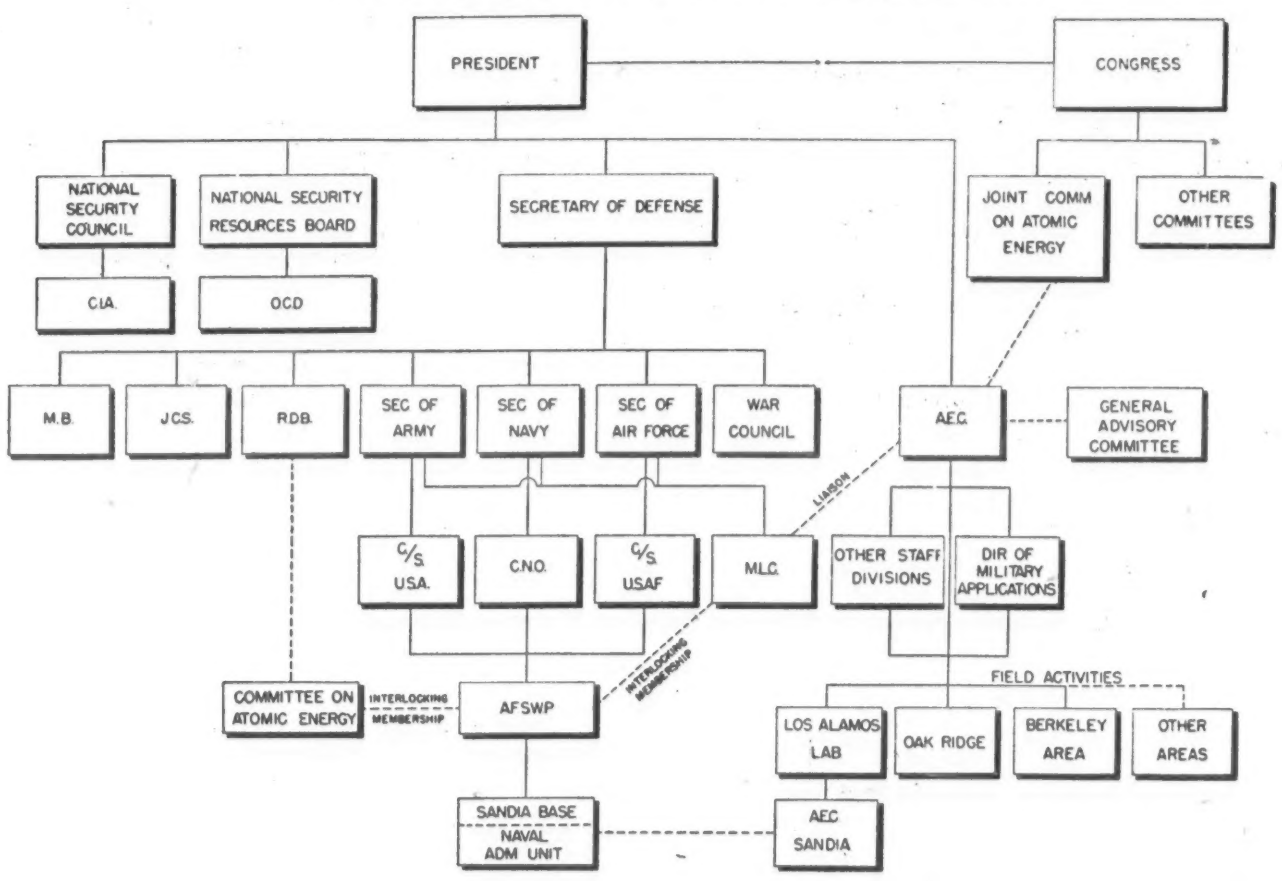
The Courses

From this beginning, the radiological training activities conducted by BuPers have grown to include the following courses:

Radiological Defense Engineering. A three-year postgraduate course conducted at the U. S. Naval Postgraduate School, Annapolis, Maryland (1 year); and at the University of California, Berkeley, California, or at Ohio State University (2 years). The mission of this course is to prepare officers in the fundamental sciences, especially in those pertaining to nuclear and medical physics and in the problems that arise as a result of nuclear processes. These officers are trained to work with medical and scientific personnel in solving problems that arise in area and theater commands. The scope of the course includes one year refresher and preparatory study in physics, mathematics, chemistry, and associated subjects, followed by 16 months of advanced study of nuclear physics as a major and radio chemistry as a minor course. Six weeks of field work with the Atomic Energy Commission or Armed Forces Special Weapons Project is included. The course leads to a master's degree for those who qualify.

Six-Week Radiological Course. This is one of the courses given at the U. S. Naval Damage Control Training Center, Treasure Island, San Francisco, California. It is designed to qualify officers of all branches of the military service, both regular and reserve, selected civilians, and employees of other governmental agencies in defensive measures against atomic weapons. The course embraces four broad areas: nu-

ATOMIC ENERGY - ARMED FORCES ORGANIZATION



clear physics, instruments and their use, evaluation of hazards, and remedial measures. Graduates are qualified to fill billets involving major participation in matters of radiological defense. The same course is also given at the Army Chemical Center, Edgewood, Maryland, and at the Air Force Technical School, Keesler Air Force Base, Biloxi.

Two-and Three-Week Indoctrination Course in Chemical Warfare, Radiological Defense, and Associated Subjects. This course is designed to train officers and selected civilians to fill minor radiological defense billets afloat and ashore. During the first two weeks the student is introduced to the latest developments in chemical and biological warfare and to the theory and principles of radiological defense. The third week, which is optional, is devoted to the particulars of radiac (radiological defense) instruments. This course is also open to Navy personnel at the Air Force Technical School, Keesler Air Force Base, Biloxi.

Two-Week Course in Radiological Defense for Reserve Officers. This two-week course is intended to provide training to Reserve Officers primarily in defensive measures against atomic weapons similar to the six week's course provided for radiological defense officers. Like the six-week course, it embraces, but on a less intensive scale, these four broad areas: nuclear physics, instruments and their use, evaluation of hazards, and remedial measures.

Four-Week Radiac Instrument Maintenance Course. This is a four-week course in radiac maintenance involving theory of operation, repair, and maintenance of radiation detection instruments used by the armed services. Graduates will serve as radiac maintenance instructors in the respective commands. It is conducted jointly for personnel of all three services. The course is open to officers, enlisted personnel, and civilians with background in electronics, physics, or equivalent experience. It is given at the Naval Damage Control Training Center, Treasure Island.

One-Week Course in Radiac Maintenance. The curricula of Electronics Technician (Class A) Schools at Treasure Island and Great Lakes include a one-week course in theory of operation, maintenance, and repair of radiation detection instruments to prepare Electronics Technicians (ET's) for servicing these devices. A similar course is given by the Naval Air Technical Training Command in the school at Memphis for Aviation Electronics Technicians.

Eighteen-Hour Radiac Maintenance Course. An 18-hour course on operation and maintenance of radiation detection instruments is included in the curriculum for electronics officers in the electronic materiel schools at both Treasure Island and Great Lakes.

Table I

RESPONSIBILITIES OF NAVY BUREAUS IN THE FIELD OF RADIOLOGICAL DEFENSE

Bureau of Medicine and Surgery

Establish safety tolerances and regulations.
Determine physiological effects and develop treatment methods.
Approve specifications for instruments to cover medical aspects.

Bureau of Ships

Develop and procure instruments for detection of radioactivity, except airborne instruments.
Develop and procure equipment for individual and collective protection for personnel on shipboard.
Develop methods and develop and procure equipment for decontamination of ships.
Conduct and coordinate studies and investigations associated with the phenomena of radiological contamination, decontamination, and radioactivity. Provide data necessary for development, application, and procurement responsibilities assigned to other bureaus and offices.

Bureau of Naval Personnel

Establish training and educational programs and conduct schools.
Establish and promulgate qualification standards of personnel assigned radiological defense programs.

Bureau of Aeronautics

Develop and procure airborne instruments for detection of radioactivity.

Bureau of Ordnance, Bureau of Aeronautics, and Bureau of Supplies and Accounts

Within their fields of cognizance, set up and coordinate advisory activities to develop a well-rounded decontamination and protection program for the Navy.

Bureau of Yards and Docks

Develop and procure equipment for collective protection of personnel ashore.
Develop methods and equipment for decontamination ashore.

Bureau of Medicine and Surgery Courses

The Bureau of Medicine and Surgery has had radiological defense courses since shortly after Bikini. At present these include the following:

Graduate Courses. A one-year graduate course for medical officers in the field of neucleonics is given at Duke University, Rice Institute, and at the University of California. A one-year practical (on-the-job) graduate course in this field is given at Oak Ridge by the Atomic Energy Commission.

Technical Training. Regular medical officers are trained in the BuPers 6-week course, and reserve medical officers are trained in the BuPers 2- and 3-week indoctrination course. Reserve medical officers also attend the BuPers 2-week reserve officer course.

To discharge its responsibility for keeping dosimetric records of naval personnel, the Bureau of Medicine includes a one-week course in photodosimetry in the six-month training of X-ray technicians given at the X-ray Technicians School, Bethesda, Maryland.

Selected graduates of the X-ray Technician School are given an eight-month course in the chemistry and in the medical application of radioactive isotopes. Graduates of this course are designated Radioactive Isotope Therapy Technicians.

Indoctrination. Reserve medical officers receive a one-week course in the medical aspects of radiological defense at either the Army Medical Center (Walter Reed Hospital) in Washington, D. C., or at the Navy Medical Center in Bethesda, Maryland.

Other Navy Radiological Defense Courses

Bureau of Yards and Docks. This bureau, in the school for CEC officers at Port Hueneme, California, has a 3-week disaster relief course for Regular Navy officers and a similar 2-week course for Reserve officers. These courses prepare CEC officers (generally the public works officer) to organize naval shore establishments to cope with all types of disaster. The Bureau of Yards and Docks considers atomic weapon attack as another form of disaster; therefore, these courses now include a considerable amount of radiological defense training so that CEC officers can organize shore bases to cope with atomic weapon attack.

Bureau of Ships. Bureau of Ships radiological defense training is directed mainly toward meeting the bureau's responsibility for ship decontamination. This bureau has, therefore, launched an extensive program for training shipyard civilian personnel in the industrial function of ship decontamination. The training program includes indoctrination courses for personnel and specialized courses for supervisors. To

(*Continued on page* 80)

RAYTHEON

The Rays of the gods

REFRIGERATORS = COMMUNICATIONS

?????????

Even the renowned digital computors don't balance that type of equation. But change it to read

YANKEE (INGENUITY + DETERMINATION) + REFRIGERATION = COMMUNICATIONS and the equation immediately balances and can be used to plot the very early course of the Raytheon Manufacturing Company.

Back in 1921 when the old ice box and 25 to 50 lbs. of ice were the ultimate in domestic refrigeration, a brilliant young scientist, Dr. C. G. Smith, engaged professionally in research on gas filled rectifiers, developed, in his spare time, a principle which he felt could be used to produce the first domestic electric refrigerator. Functionally sound and with no moving parts, it looked to be a cinch for mass production—it could be the Model T of the refrigeration industry.

The idea fired, also, the imagination of a friend and associate, L. K. Marshall, and the two proceeded to handmake a model which turned out well enough to allow them to raise the capital necessary to properly finance and launch the American Appliance Company. Officially under way in mid 1922 the infant company enjoyed not only the services of such astute individuals as Dr. C. G. Smith, L. K. Marshall, Vannevar Bush, and several others of the same caliber, but also a most lenient charter, which allowed it to do virtually anything from producing refrigerators to selling real estate.

As the months following the lusty and hopeful start unfolded, it gradually became evident to the officers of the American Appliance Company that available materials and production techniques of the day were not sufficiently advanced to properly complement the theory of the refrigerator. The Model T of the refrigerator industry was obviously running out of gas—And so with typical Yankee ingenuity and determination the directors took advantage of the company's broad charter and their collective experience with gas filled rectifiers. The decision was made to make and sell this type tube. Arrangements were made to purchase patents covering the hydrogen filled S tube which Dr. Smith had developed earlier while employed by the American Radio & Research Company of Cambridge, Massachusetts, and from this point forward Dr. Smith devoted his entire time to research in this field, while the company turned to the production of tubes which flowed from his laboratory.

About the same time it developed that another company in Illinois was also operating under the name of the American Appliance Company, and since its charter preceded that of the Boston company a new name became the order of the day. Out of the myriad of names that were considered one stood out above all the rest—Raytheon. A composite of the word ray and the Greek word theon, meaning literally "of the Gods," Raytheon seemed particularly descriptive of the type work on which the company was embarking—and it was—for in the succeeding 25 years "The Rays of the Gods" generated by the tubes designed and produced by Raytheon have played a most important role in the communications and other electronic fields.

Today Raytheon is a national organization with plants in Waltham, Newton and Quincy, Massachusetts, Chicago, Illinois, and Oelwein, Iowa and complementing these production facilities, its distribution and service systems extend throughout the entire United States as well as into 75 foreign countries.

Revolutionary "B" Tube

The decision to concentrate the efforts of the new company on gas filled tubes proved to be most sound for just as the American public is now clamoring for TV, a quarter of a century ago it was ripe for radio and particularly receptive to the now famous B tubes which Raytheon then placed on the market. A modification of the S tube which had been originally developed by Smith for use in the power supplies of amateur radio transmitters, the B tube was a revolution in its day. A cold cathode gaseous rectifier which changed the alternating current in the house lighting line into DC power required for the operation of a radio set, it did away with the need for the expensive troublesome B batteries then required for radio operation. In short, it heralded the arrival of the first house current receiver.

Raytheon's first few years in the new field were busy. The demand for its rectifier tubes was so great that sales reached a million dollars a year, but before long the original B tube was superceded by others and Raytheon turned to the manufacture of standard receiving tubes. It is interesting to note, however, that Raytheon's Newton Plant continues to make millions of cold cathode rectifiers each year and over half of the automobile radios in the country today are equipped with its tubes.

By 1930 there were approximately 100 companies in the United States making receiving tubes. By 1941 only seven were left. Through these years

Raytheon sales averaged somewhat better than 10% of those of the total industry, and today it still maintains its strong position in the field. As a matter of fact in recent months it has actually enjoyed more tube sales than ever before in its history.

Special Purpose Tube Growth

In the middle 1930's Raytheon chose to supplement its production of radio receiving tubes and began manufacturing tubes for use in a wider variety of electronic equipments. Over a period of fifteen years this particular activity, that is the design and production of special purpose tubes, has expanded to the point where it now constitutes the largest part of Raytheon's total tube business. As a matter of fact the company has just completed an addition to its power tube plant in order to increase its capacity to produce all sizes of TV picture tubes, up to the 19" circular type as well as the large rectangular tubes.

Before and during the 30's Raytheon was constantly looking beyond radio receiving and other tubes to the broader future of electronics. To diversify its production it purchased the Acme-Delta Company of Cambridge, Massachusetts which during the late 1920's was one of the largest manufacturers of high quality radio transformers. Moved to Waltham in 1933, this operation formed the nucleus of the company's present electronic Equipment Division, and today many of the transformers and other magnetic component products developed in the 1930's, such as its volatge stabilizers, RECTI-CHARGERS,® telephone battery chargers, RECTIFIERS,® telephone battery eliminators, etc.. are still being made in the original transformer building.

From this same background spring many other of the company's present industrial products. For example:

Type RTR* television microwave relay carries network video programs as studio-to-transmitter link, intercity link, or remote TV pick-ups. In actual practice (WMAL, Washington, D. C.) fully satisfactory service has been effected over 55 airline miles.

*Raytheon Trade Mark. Reg. U.S. Pat. Off.

There is its "WELDPOWER"® line of stored energy controls, and bench mounted welding heads, which provide not only the type energy that makes it possible for the first time to weld on a practical mass production basis such metals as aluminum, magnesium, copper alloys, etc., but also, through the unique features of the head, the consistent and precise welding pressure so essential if the weld is to be made without the usual telltale indentations and discolorations which require additional costly processes to remove or cover up.

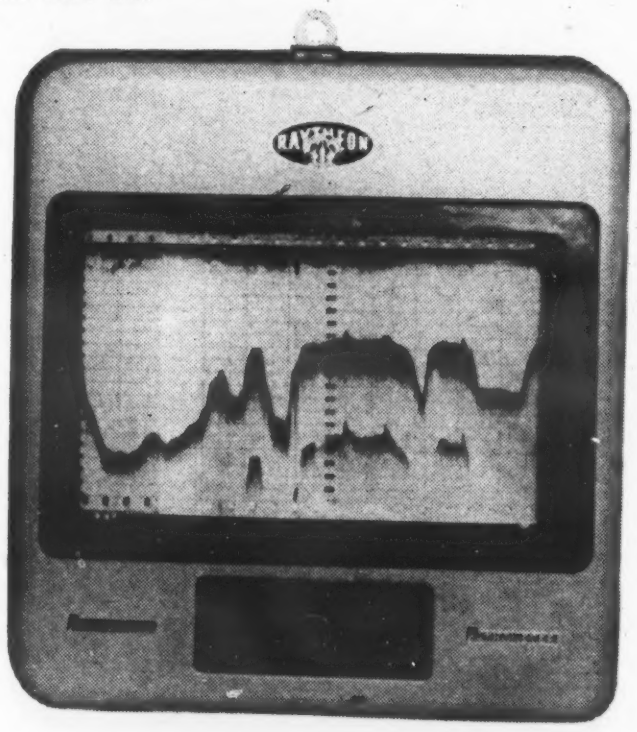
Throughout the years policy that profits be plowed back into the company's research programs on high frequency radiation and general industrial electronics. As a result the company, even before World War II, had developed and was producing on an experimental basis, picture tubes for television receivers. About the same time at the Belmont Radio Corp., in Chicago, later to become a part of the Raytheon family, engineers were actively engaged in television research and by 1939, had produced a number of TV receivers which they placed in selected homes in order to determine the commercial feasibility of the new art.

This logical preparation for the future in both tubes and electronic equipment prepared Raytheon for an outstanding role in World War II.

Its historic work on the all important magnetron began late in 1940, when it accepted various assignments calling for the refinement of the tube as it then

Indicating Fathometer Jr.* and Recording Fathometer Jr.* find wide use on commercial fishing vessels to indicate not only depth of water but also schools of fish so that nets and lines may be dropped to desired depth.

*Raytheon Trade Mark. Reg. U.S. Pat. Off.



existed. Aside from the problems associated with the functional design of the magnetron, others existed particularly with respect to supply, for at that time production of the tube was pitifully slow and during the first three or four years of the war, was the gating item in the production of vital radar equipments. Because of the extreme importance of increasing magnetron production, Raytheon devoted considerable energy to the solution of this problem. Originally better than 100 hours of precision machine work was required in the production of a single magnetron, but through a laminating and brasing process developed at Raytheon the bulk of this work was eliminated and real mass production of the tube became possible. In its Power Tube Plant which Navy officials had estimated to have a maximum capacity of 100 magnetrons per day, output soared to 1000 a day, and eventually 2500. From the time this rate of production was reached not a single radar was held up because of the lack of a magnetron.

Today Raytheon is unsurpassed in its knowledge of the magnetron, and is the world's largest producer of the tube which in addition to its military role is finding peace time application in commercial radars, microwave diathermy equipment, electronic ovens, TV relay systems and general microwave communications.

The MICROTHERM.® Raytheon's microwave diathermy equipment is an excellent example of the direct peacetime application of skills and knowledge gained during the war, for the equipment generates the same type high frequency, or microwave energy used in Radar equipments. By means of suitable applicators this energy may be directed at any selected portion of the body, and once it enters the body, it is absorbed by the fats, the tissues, muscles, etc., and converted into heat, which in turn produces the desired therapeutic equipment. Because of its ability to penetrate deeper and heat more uniformly, the MICROTHERM® is providing the medical profession with some new answers to some very old problems. For example, it is assuming a very definite place in the treatment of arthritis.—By reaching deep into the area around the affected joint, the heat generated stimulates the flow of blood as never before possible and this in turn tends to dissolve and carry away the calcium deposits before they have a chance to harden and gradually destroy the motility of the joints.

A product of the power tube division, Raytheon's diathermy equipment (console model shown above) is American Medical Assoc. approved and widely used. It has taken a position of leadership in the diathermy field in the space of three years.

Increasing use of the equipment is also being made in the relatively new field of rehabilitation of limbs damaged by wounds, or diseases. Here again increased circulation of blood as well as the actual heating of the muscles helps to prevent atrophy, by keeping the limbs flexible and useful.

Of course, the old standbys, aching and sprained muscles and ligaments are wonderful targets for the MICROTHERM.® As a matter of fact many of the large colleges, as well as professional ball teams include the MICROTHERM® as standard equipment for their athletic departments.

Incidentally, the RADARANGE,® Raytheon's electronic cooker which created so much interest a year or so ago is still very much in the picture. Considerable time and effort is currently being expanded in analyzing the results of the installations made in the past couple of years in order to obtain a clear picture of practical applications and to determine what changes in the equipment or techniques, if any, must be made in order to assure the most effective results.

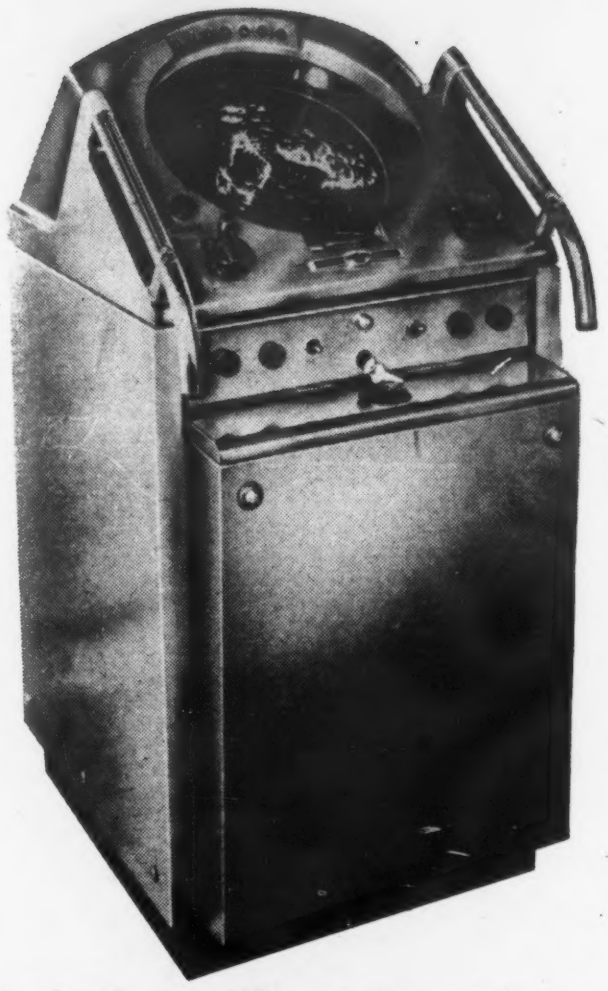
By way of illustrating the type of work now being carried on, there is a particularly interesting installation of the unit aboard the S.S. *America*, the flagship of the U. S. Lines. Installed initially, over a year ago this equipment has made many ocean trips and during this time Otto Bismarck, executive chef of the U. S. Lines has developed methods for cooking many dishes that have never before been cooked electronically. For example, he turns out a 12# rib roast, medium rare, in 35 minutes, where it would require over 2½ hours by ordinary methods, or even better, he's done a 49# roast in 52 minutes. As a result of such work the RADARANGE® has become one of Otto's most useful tools.

Typical Raytheon production line, employed in the manufacture of transformers and other magnetic components.

Search Radar

While working on the magetron it was only natural, of course, that Raytheon devote considerable energy to engineering surface search radar equipment around the tube. This it did with considerable success, and by the end of the war the records showed that all of the shipborne surface search radar equipments used by the Navy 75% were supplied by Raytheon. An important Navy officer has since stated that Raytheon radar had a marked effect on every marine engagement of the war.

Today a quick glance at the larger commercial vessels in almost any port of the world will show that Raytheon's experience in this field has not been lost to the commercial world. The major portion of these vessels carry the



Raytheon's new 16" presentation indicator unit, used in conjunction with the company's 10 cm commercial marine radar equipment, provides a viewing area half again as large as anything previously available.

antenna of the MARINERS PATHFINDER,® Raytheon's commercial radar.

Representative of this line is its brand new 16" indicator, outstanding from a functional point of view because of its exceptionally large viewing area —better than half again as large as anything heretofore available, and because of its remarkable definition which makes it easier to identify targets appearing on the scope, and outstanding from a styling point of view to the extent that it was one of five winners of an honorable mention award made as a result of the 12th Annual Manufacturing Product Design Award Competition, conducted by *Electrical Manufacturing*.

This is the equipment that is located on the bridge. And the captain, while his ship is moving through fog or darkness, can stand before it and see and locate on the scope any object located within 50 yards to 40 miles away from his boat. With such information, periods of low visibility no longer bring the ships and the profits of the shipper to a standstill. Ocean liners can move into the harbor on schedule; tugs and other small boats can continue their work within the harbor, and on the great lakes the ore carriers and other boats can continue to negotiate safely the narrow rivers and locks connecting the lakes.

Since 1939 Raytheon's special tube section in Newton, Massachusetts has enjoyed the position of the world's leading manufacturer of submarine hearing aid tubes, and currently better than 85% of all hearing aids used throughout the world are equipped with some type of Raytheon tube.

In 1940 this experience with subminiature tubes allowed Raytheon to play another vital role in the war. At that time the Government had under consideration what is now known as the proximity fuse—destined to become one of the greatest scientific weapons of World War II, overshadowed only by the Atomic bomb and radar.

The idea was to build a radio receiver so small that it would fit into the nose of an anti-aircraft shell and be rigged so that it would explode the missile when it passed within the destructive range of a target, thus obviating the need of a direct hit. Subminiature tubes made it possible to realize the size requirements of such a set, but the shock requirements of the tubes in particular were colossal. Late in 1940 Raytheon received a Government contract to develop a subminiature tube which would stand the shock of being fired from an anti-aircraft gun, and despite Government odds of 100,000 to 1 against success, a tube meeting the Government specifications was made available in 1941. From that time forward the production of Raytheon tubes for proximity fuses skyrocketed.

Machine used in the packaging of receiving tubes.

First cousins of these subminiature tubes are now finding extensive application in such widely different devices as walkie-talkies, dictating machines, business machines, computors, aircraft ignition systems, guided missiles, etc.

During the course of the war Raytheon was awarded a total of four Army-Navy "E's" and several members of its personnel received high civilian awards for their wartime contributions. During the last year of the war Raytheon and the companies which would shortly become its subsidiaries shipped, in the aggregate, over one quarter of a billion dollars worth of electronic equipment.

Raytheon continues to be a major supplier to the armed services, furnishing highly complex electronic gear including radar, sonar, and communications equipments, as well as magnetrons, receiving and special purpose tubes. It is deep into the military electronic development program doing work for all three services. Hand in glove with this work it is developing for a particular government agency, the much publicized digital computer, which solves in minutes intricate mathematic problems which would ordinarily require years of the most skilled mathematical work. Raytheon's backlog of

(*Continued on page 76*)

A section of Raytheon's Waltham, Mass., plant.

ARMED FORCES COMMUNICATIONS ASSOCIATION

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1952

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Oliver Read
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1954

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Joseph C. Wilson*

1955

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Ellery W. Stone

**Executive Committee Member*
†Executive Committee Member, non-voting

ASSOCIATION AFFAIRS

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Executive Committee Meeting

Friday the 13th, shunned by the superstitious as a bad day for planning any event, proved a good day in July for the AFCA Executive Committee second quarterly meeting. Whereas it is usually difficult to get committee members together in toto, because of the press of the members' normal business activities, the July 13th meeting brought out the executive committee in full. The complete attendance was the more notable since the committee number is larger than heretofore, the membership having been increased by action of the national directors at the Association's convention last April in Chicago. Several AFSA national directors also attended the executive committee session, by invitation.

On behalf of the Philadelphia Chapter, Director J. Harry LaBrum reported at the committee meeting that planning was already well underway by his chapter for the AFCA 1952 national convention to be held April 24-25-26 at Philadelphia. The convention committee, Mr. LaBrum reported, held its first meeting June 29th and appointed committee chairmen. LaBrum himself was named presiding chairman, Chapter President Harry E. Ehle will be chairman of the planning committee, W. Walter Watts general chairman, Robert G. Swift coordinating chairman, and J. R. Curley chairman in charge of registration and accommodations.

The status of Rear Admiral Earl E. Stone, USN, as an executive committee member was given discussion at the executive committee meeting, since Admiral Stone is to be away at sea in his new command post assignment. It was agreed that Admiral Stone should retain his offices as vice president and director, but would be replaced on the executive committee by Major General Francis L. Ankenbrandt, USAF, who is also a vice president and director.

In Admiral Stone's absence, Joseph C. Wilson, as next senior vice president will take over various duties which normally fall to the first vice president, including the post of National Director of Chapters.

Executive committee members present at the July 13 meeting were: AFCA President William J. Halligan, Past President Theodore S. Gary, Past President Frederick R. Lack, Admiral Stone (1st vice pres.), Mr. Wilson (2nd vice pres.), Gen. Ankenbrandt (3rd vice pres.), Maj. Gen. Kirke B. Lawton (4th vice pres.), George W. Bailey, Percy Black, J. Harry LaBrum, W. Walter Watts, Ralph Grist (representing William H. Mansfield), Executive Secretary George P. Dixon, and Counsel Frank Wozencraft.

AFCA 1951 Service Academy and ROTC Awards

Service Academy Awards

The AFCA prizes awarded annually at Annapolis to the graduating midshipman having the highest rating in electronics and at West Point to the graduating cadet having the highest rating in electricity were donated this

Below, left: AFCA director Col. Percy Black made the presentation of the AFCA award to the U. S. Military Academy's cadet rating highest in electricity, William L. Lemnitzer. The general in the photo is proud parent, Maj. Gen. L. L. Lemnitzer, C. G. of the 11th Airborne Division Command. Right: Midshipman John Neal Green, who rated highest in electronics at the U. S. Naval Academy, is presented the AFCA award by Vice Adm. A. S. Anderson of the Automatic Electric Co. which donated both the service academy prizes. Col. Black, president of AFCA's Washington Chapter, is also an official of Automatic Electric.

Presentation of AFCA Awards to Outstanding Students

Carnegie Tech: Phillip V. Mitchell, Signal Corps ROTC, receives AFCA gold medal, presented by President Fred E. Moran, AFCA Pittsburgh Chapter.

Rensselaer PolyTech: Frank Paolini is presented the AFCA gold medal by Professor G. Carrigan, chairman of physics department.

University of Pennsylvania: Albert E. Miller III, USNR, winner of AFCA gold medal, receives award from Captain H. R. Stevens, USN.

Syracuse University: John Van Putten, AFCA gold medal winner, is presented award by Lt. Col. James B. Smith, Signal Corps, asst. PMS&T.

Washington State College: Darrell W. Scheffert receives AFCA bronze medal. Presentation was made by Professor Homer J. Dana.

Syracuse University: John Douglas Porter, winner of AFCA bronze medal, is presented award by Lt. Col. James B. Smith, Signal Corps asst. PMS&T.

New York University: Stephan Lipsky receives AFCA bronze medal from Lt. Col. Wayne Litz, chief of ROTC Affairs Section, Office of the Chief Signal Officer.

New York University: William S. Furman, awarded the AFCA gold medal, is congratulated by Lt. Col. Wayne Litz, OCSigO, who made the presentation.

Carnegie Tech: Joseph W. Strauss receives from E. J. Staubitz, a director of the AFCA Pittsburgh Chapter, a U. S. Veteran Signal Corps Association medal.

year by the Automatic Electric Company of Chicago.

Each prize consisted of a Stereo Realist Camera with leather case, a Stereo Realist Viewer and a flash attachment. An official of the Automatic Electric Company presented the award at each academy on behalf of the association.

Annapolis

Midshipman John Neal Green of Taylorsville, Indiana, won the AFCA award at the Naval Academy for the highest standing in the electronics course. An enlisted man before his appointment to the academy from the Naval Reserve, Midshipman Green graduated third in his class of 722 with a four-year average of 90 per cent. He also earned awards in soccer, track and cross country, and was active in the Spanish and Marine Engineering Clubs.

Midshipman Green was commissioned an ensign and, after graduation leave, was assigned to a ship in the Pacific Fleet.

The prize was presented by Vice-Admiral W. S. Anderson, USN(Ret.), a director of the Automatic Electric Company.

West Point

Cadet William Lyman Lemnitzer was the recipient of the AFCA award at the Military Academy for the highest rating in the study of electricity. Son of Major General L. L. Lemnitzer, commanding officer of the 11th Airborne Division, Fort Campbell, Kentucky, Cadet Lemnitzer won his appointment to the academy by standing first in the Presidential entrance examinations in 1947. For many years he has had a dual interest in both scientific and military affairs, and at the academy was active in intramural athletics, especially soccer, lacrosse and wrestling.

Cadet Lemnitzer was commissioned a second lieutenant in the artillery and has been assigned for duty at Fort Meade, Maryland.

The prize was awarded to Cadet Lemnitzer by Colonel Percy G. Black, USA(Ret.), assistant vice-president of the Automatic Electric Company.

Awards To ROTC

Following is the list of outstanding ROTC cadets who were awarded the AFCA gold, silver and bronze medals this year. The winners were selected by the military, air and/or naval science departments at each college. Reports coming into national headquarters from all over the country indicate that the awards are a definite contribution to the ROTC programs and are doing much to stimulate interest in communications and electronics training.

A number of colleges had not been heard from as SIGNAL went to press and it is hoped that the names of their winners will be available for the next issue.

A & M College of Texas

Albert E. Nicholson, Jr., cadet lt. col., Brownfield, Texas—gold medal. Commander, Hqs. ASA-SC Battalion, composite regiment; B.S. in electrical engineering; distinguished military student; member IRE, AIEE; president, Joint AIEE-IRE Society; student engineer's council.

John D. Carter, cadet 1st sgt., Ballinger, Texas—silver medal. Secretary—Joint AIEE-IRE Society; electrical engineering major.

Donald F. Carroll, Dallas, Texas—bronze medal. Mechanical engineering major.

Alabama Polytechnic Institute

Winners not reported as SIGNAL went to press.

Carnegie Institute of Technology

Phillip V. Mitchell, cadet lt. col., Bartlesville, Okla.—gold medal.

Earl R. Wingrove, cadet lt., Pittsburgh, Pa.—silver medal. President of the student section of AFCA Pittsburgh Chapter.

W. A. Stewart, Kenmore, N. Y.—bronze medal.

Clarkson School of Technology

Winners not reported.

Clemson Agricultural College

Jack C. Ferguson, cadet 1st lt.—gold medal.

Tom W. Morgan, Jr., cadet 2nd lt.—silver medal.

Herbert W. Fletcher, cadet corporal—bronze medal.

Cornell University

Herman A. Hanemann, Jr., New Cumberland, Pa.—gold medal. Majoring in electrical engineering; top man in class in both academics and leadership.

Charles W. West, Jr., West Point, N. Y.—silver medal. Electrical engineering major; top honors in academics and leadership.

Albert D. Rossin, New York, N. Y.—bronze medal. Majoring in education; leading student in class in leadership and drill.

Georgia Institute of Technology

Benjamin R. McRee, cadet lt. col., Athens, Georgia—gold medal. Electrical engineering major; executive officer, AFROTC Wing; Lambda Chi Alpha, Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi; YMCA cabinet; dean's honor list.

Terrell N. Lowry, cadet m/sgt., Atlanta, Ga.—silver medal. Electrical engineering major; member Tau Beta Pi, Eta Kappa Nu, IRE and Toastmasters International; dean's honor list.

Ervin C. Lentz, Jr., cadet sfc, Beloit, Wisconsin—bronze medal. Mechanical engineering major; Phi Kappa Tau, Pershing Rifles, Phi Eta Sigma; dean's honor list.

Iowa State College

James H. Scharff, Waterloo, Iowa—gold medal. Electrical engineering major; Kappa Sigma fraternity; Pershing Rifles, Drum and Bugle Corps; college band.

Charles E. Pallas, Des Moines, Iowa—silver medal. Electrical engineering major; president, Beta Sigma Psi; Eta Kappa Nu; AIEE-IRE, executive council member; treasurer, interfraternity council.

Time Features Sarnoff

AFCA's first president, Brigadier General David Sarnoff, board chairman of the Radio Corporation of America, was the cover subject of the July 23 issue of *Time* magazine, while the fabulous career of the RCA chief executive was recounted in a comprehensive story in the weekly news publication.

"American business biography," says the *Time* article, "abounds in up-from-the-bottom stories; few are quite so dramatic and revealing as Sarnoff's. Owen D. Young (who as General Electric vice president got G.E., Westinghouse, United Fruit, and AT&T to pool all their wireless patents and jointly organize RCA) said that Sarnoff had lived 'the most amazing romance of its kind on record.' Horatio Alger himself could hardly have done it in one book; he would have needed *Adrift in New York, Nelson the Newsboy, The Telegraph Boy*, and *Joe's Luck or Always Wide Awake*."

Ofttold, the Sarnoff story remains ever fascinating to consider, and actually gains with every telling the feeling of dramatic adventure in communications and industry. For as radio and television developments year by year present new wonders, the foresight and vision of General Sarnoff, an outstanding factor in RCA success, is pointed up and made to seem the more remarkable.

Many of the newer members of the AFCA may not be familiar with the details of General Sarnoff's presidency of this association. Selected to head the new organization at its inception in May of 1946, the RCA chieftain remained as the association's president until July 1949, the only president in AFCA history to hold office for more than one year.

As the association's first president General Sarnoff gave generously to the fledgling organization in its early struggles the talents of strength and vision that had made him a giant in the communications industry. His addresses at the association's first three annual conventions, at New York City, Dayton, Ohio, and Washington, D. C., brought national attention to the new organization and helped set the foundation for sound standing and prestige in AFCA's field.

Ralph D. Hamilton, University of Idaho, AFCA silver medal.

Oscar J. Petersen, Montana State College, AFCA gold medal.

Robert W. Glahe, Tennessee Polytech, AFCA gold medal.

Cecil W. Hathaway, University of Idaho, AFCA gold medal.

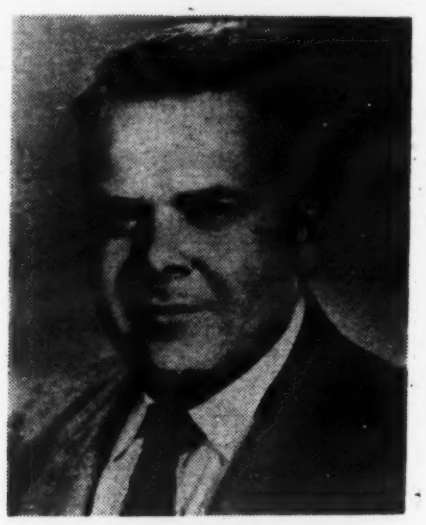
Jack D. Boman, Kansas State College, AFCA silver medal.

Donald F. Elwell, Montana State College, AFCA silver medal.

Jack W. Hannah, Oregon State College, AFCA gold medal.

Marc C. Shoquist, University of Minnesota, AFCA gold medal.

Robert W. Morgan, Union College, AFCA silver medal.



Leonard B. Dunn, Union College, AFCA gold medal.

Leonard J. Weber, Oregon State College, AFCA silver medal.

John M. Alton, University of Minnesota, AFCA silver medal.

Terrel N. Lowry, Georgia Tech, AFCA silver medal.

Benjamin R. McRee, Georgia Tech, AFCA gold medal.

Ervin C. Lentz, Jr., Georgia Tech, AFCA bronze medal.

David C. Ayers, Kansas State College, AFCA bronze medal.

James D. Conlan, Des Moines, Iowa —bronze medal. Electrical engineering major; Phi Kappa Tau. AIEE-IRE; inter-fraternity intramural council.

Kansas State College

Frank L. Westerman, Jr., Great Bend, Kansas—gold medal. (Also won AFCA award in 1950.) Electrical engineering major; Phi Kappa Phi, Eta Kappa Nu; IRE, AFCA, ARRL. Now working for Hazeltine Electronics Corporation, Little Neck, L.I.

Jack D. Boman, Iola, Kansas—silver medal. Electrical engineering major; Eta Kappa Nu; Sigma Tau; Scabbard and Blade; distinguished military student.

David C. Ayers, Webster Grove, Mo. —bronze medal. Electrical engineering major; operates amateur radio station WOUU; IRE, AIEE, Kansas State Engineers, Pershing Rifles.

Lehigh University

Harold W. Chapman, Bethlehem, Pa. —gold medal. Served with Army Air Corps from 1942 to 1946, and with U. S. Weather Bureau as electronics technician in Japan and Korea from 1946 to 1948 in conjunction with USAF 20th Weather Squadron. Graduated with honors from Lehigh this June and was commissioned second lieutenant with orders for active duty with the Air Force's newest command—air research and development. Reported to Wright Patterson AF Base in July. Member AFCA, AIEE, IRE, Kappa Nu.

F. Gordon Maxson, Glenside, Pa.—silver medal. Electrical engineering major; Arnold Air Society, Scabbard and Blade, Alpha Phi Omega, American Chemical Society, the Newtonian Society, Glee Club; designated distinguished military student.

Massachusetts Institute of Technology

Walter I. Wells, cadet major, Kansas City, Mo.—gold medal. Veteran; worked with Philco past three terms; designated distinguished military student; awarded insignia for academic achievement for four years; member IRE and MIT Television Society.

William R. Miller, Brooklyn, N. Y. —silver medal. Electrical engineering major; managing editor, "The Tech"; Pershing Rifles; Tau Beta Pi; manager baseball team.

Redmond R. O'Brien, Quincy, Mass. —bronze medal. Awarded ROTC insignia for academic achievement freshman year; on first dean's list for past three terms; member MIT Mathematics Society.

Michigan State College

Charles J. Steigleder, cadet major, East Lansing, Mich.—gold medal. Veteran with 2 years' service in Navy; electrical engineering major; designated distinguished military graduate; member Tau Beta Pi, Pi Tau Pi Sigma, Eta Kappa Nu.

William W. Miller, cadet 2nd lt., Lansing, Mich.—silver medal. Majoring in physics; member Scabbard & Blade, Pi Tau Pi Sigma; designated distinguished military student.

Myron J. Lickey, cadet 2nd lt., Detroit, Mich.—bronze medal. Veteran with 3 years' service in Navy, six combat battle stars, overseas service—Asiatic, Pacific, Philippine Islands. Electrical engineering major; Pi Tau Pi Sigma; dormitory council; distinguished military student.

Montana State College

Oscar J. Petersen, Somers, Montana —gold medal. Three years' war service with the Navy. Member Sigma Chi, Scabbard and Blade, Associated Society of Mechanical Engineers, Ski Club; intramural athletics.

Donald F. Elwell, Havre, Montana—silver medal. Served in USAF 1946-48 —radar and GCA school at Boca Raton, Fla.; 143rd AACS Sqdn at Westover Field, Mass., as radar repairman. Electrical engineering major; Kappa Sigma, Phi Eta Sigma, Tau Beta Pi; Student Senate; business manager, school annual.

New York University

William S. Furman, South Orange, N. J.—gold medal. President, AFCA student chapter.

Philip S. Warnes, New York, N. Y. —silver medal.

Stephen Lipsky—bronze medal.

North Carolina State College

Winners not reported.

Norwich University

Frank Wong, cadet 2nd lt., Northampton, Mass.—gold medal. Distinguished academic and military student; awarded commission as second lieutenant in regular army.

Don G. Hassett, cadet sgt. 1st class. Hudson Falls, N. Y.—silver medal. Honor student; outstanding athlete; appointed cadet captain for next year.

Roderick R. Howe, cadet corporal. Ashland, Ohio—bronze medal. Signal honor platoon; appointed cadet first sergeant for next year.

Ohio State University

James E. Rhodes, cadet major, Canton, Ohio—gold medal. Distinguished military student, President, class of 1951; member Scabbard and Blade; rated number one in technical training ability at Fort Monmouth summer camp.

James M. Swiger, cadet 2nd lt., Waverly, Ohio—silver medal. Distinguished military student; Scabbard and Blade; AIEE.

Dominic A. Rosato, cadet corporal New York, N. Y.—bronze medal. Electrical engineering major; member AIEE.

Oklahoma A&M College

Richard H. Brown, cadet major, Stillwater, Okla.—gold medal. Electrical engineering major. Distinguished military student; member Sigma Tau. Scabbard and Blade, Phi Eta Sigma. Employed for summer at Signal Corps Laboratories, Fort Monmouth.

Chapter of the Year

At the close of the first three months of the new contest, which runs from April 1, 1951 through March 31, 1952 (NJK note), the following chapters were running in the lead:

	points		points
Gulf Coast	5.22	Rochester	4.14
Boston	4.65	Chicago	4.03
Philadelphia	4.44	Pittsburgh	4.01
New York	4.35	Fort Monmouth	3.82
Baltimore	4.30	Cleveland	3.43

Rules of the contest may be found on page 40 of the May-June 1951 issue of *Signal*.

New Chapter Application

A charter for a new AFCA chapter, to be named the F. E. Warren-Cheyenne Chapter, has been applied for. The first half of the embryo chapter's name is for the Francis E. Warren Air Force Base, located near Cheyenne, Wyoming.

The new chapter, sponsored by the 3450th Technical Training Wing at the Warren bast, held its charter meeting on August 9, and had reported 31 charter members before that date. Initial officers designated were Roderick E. Lacy, president; Thaddeus D. Byars, secretary; and 1st Lt. James E. Ekstrand, treasurer.

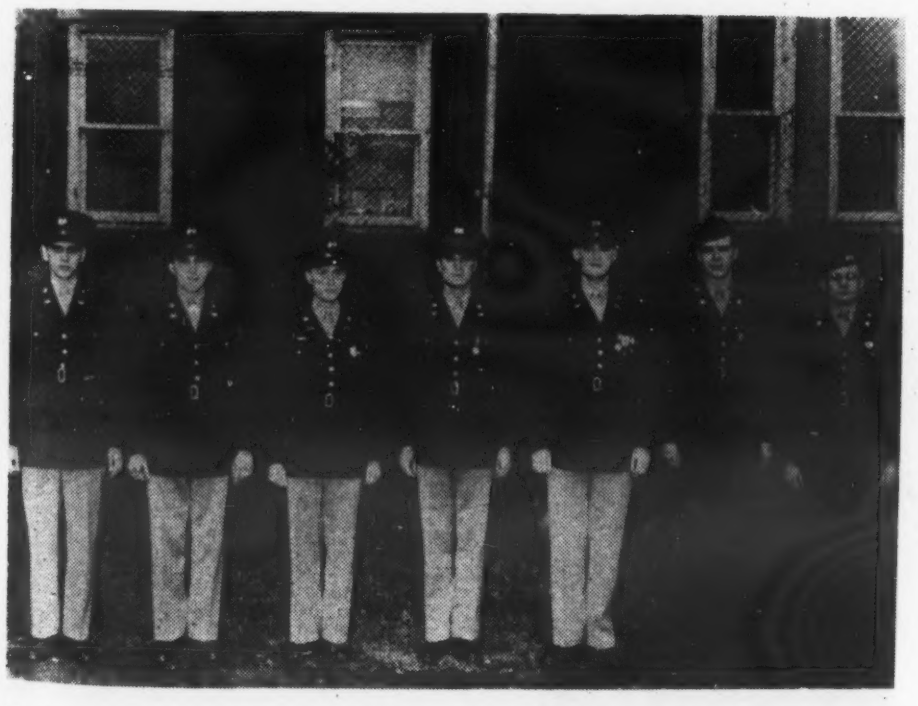
Elmer Green, University of Washington, winner of AFCA gold medal.

Carnegie Institute of Technology: Earl R. Wingrove, outstanding first year advance Signal Corps student and president of the student section, AFCA, is presented the AFCA silver medal by Vice President S. C. Stoehr of the AFCA Pittsburgh Chapter.

Iowa State College award presentations. From right: Thomas E. Ryan, U. S. Vet. Signal Corps Assn. medal; Charles E. Pallas, AFCA silver medal; E. Charles Thulin, Chicago Tribune award; James D. Conlon, AFCA bronze medal. Dean H. V. Gaskill making awards.

Ohio State University: L to R: Robert E. Forney, ROA silver award; James E. Rhodes, AFCA gold medal; Wilbur S. Wayman, U. S. Veterans Signal Corp Assn. medal; James M. Swiger, AFCA bronze medal; Dominic A. Rosato, AFCA bronze medal.

Massachusetts Institute of Technology: Walter I. Wells is congratulated by Rear Adm. Thomas F. Halloran, USN (ret.) who awarded him the AFCA gold medal. Center, Stanley A. Kasowski won ROA medal, and John C. Champeny, right, the U. S. VSCA medal.



West Virginia University award winners. Center, John H. Gallagher, AFCA silver medal; Next right, Robert G. Brake, AFCA gold medal; next right, John R. Leeson, AFCA bronze medal. Blake also won ROA medal and U. S. VSCA medal.

University of Wisconsin: John F. McNall is presented AFCA silver medal by University President E. B. Fred. To left of McNall is AFCA gold medal winner Melbourne E. Rabedeau. To right of McNall, Thomas T. Thwaites, AFCA bronze medal winner.

Frank A. Carter, cadet captain, Stillwater, Okla. — silver medal. Distinguished military student; electrical engineering major; member Phi Eta Sigma, Sigma Tau, International Relations Club, AIEE.

Glenn R. Elliott, cadet sgt., Stillwater, Okla.—bronze medal. Electrical engineering major; Phi Eta Sigma; dean's honor roll.

Oregon State College

Jack W. Hannah, midshipman lt. JG, Toledo, Ohio—gold medal. Physics major. Was commissioned ensign, USN, upon graduation and assigned to USS *Badoeng Strait* (CVE 116).

Leonard J. Weber, cadet 2nd lt., Portland, Oregon—silver medal. Electrical engineering major. Served in Navy 1945-48; taught at U. S. Navy electronics school for 1½ years.

Alvin W. Urquhart, Cadet SFC, Portland, Oregon—bronze medal. Majoring in science; plans to be college instructor of technical subjects.

Pennsylvania State College

Robert H. Groff—gold medal.
Joe O. Replogle—silver medal.
Norman E. Bowne—bronze medal.

Purdue University

Winners not reported.

Rensselaer Polytechnic Institute

Cadet Capt. *Frank Paolini* — gold medal.

Cadet Sergeant *Caughlin* — silver medal.

Midshipman Third Class *Bately*—bronze medal.

Rutgers University

Winners not reported.

Southern Methodist University

Fred M. Woodruff, Dallas Texas—gold medal.

Claude E. Stephenson, Jr., Dallas, Texas—silver medal.

Syracuse University

John Van Putten, cadet major, Passaic, N. J.—gold medal. Veteran with service in the Navy as a signalman. Distinguished military student.

John D. Porter, Kirkville, N. Y.—bronze medal. Served in the Navy during the war as electronics technician's mate aboard the USS *Charr* (SS328) and the USS *Sealion* (SSP315).

Tennessee Polytechnic Institute

Robert W. Glahe, Cookeville, Tenn.—gold medal. Graduate of Univ. of Illinois, is taking mechanical engineering at Tenn Tech. Member of the honorary fancy drill platoon.

Wendell E. Kendrick, Chattanooga, Tenn.—silver medal.

Landin F. Boring, Riceville, Tenn.—bronze medal.

Texas Technological College

Bobby J. Covey, cadet 2nd lt., Loco, Texas—gold medal.

John C. Pinson, cadet sgt., Lubbock, Texas—silver medal.

James R. Relyea, cadet cpl., Dallas, Texas—bronze medal.

Union College

Leonard B. Dunn, cadet capt., Rome, N. Y.—gold medal. World War II veteran with service in the Air Force. While attending college worked part-time for N. Y. Telephone Co., Griffiss AF Base, radio stations WKAL, WEAV and WSNY. Electrical engineering major.

Robert W. Morgan, cadet lt., Kenmore, N. Y.—silver medal. Veteran with 2 years' service in Navy. Electrical engineering major. President

Clemson Agricultural College. Herbert W. Fletcher, AFCA bronze medal winner, is congratulated by Col. J. H. Sams, dean of engineering. Tom W. Morgan, Jr., AFCA silver medal, and Jack C. Ferguson, AFCA gold medal, stand at Fletcher's right.

of W2GSB, college "ham" station, and on staff operating WRUC, college broadcasting station.

University of Alabama

Walter B. Mitchell, Mobile, Ala.—gold medal. Physics major; distinguished military student; president, Sigma Phi Epsilon; secretary, Zeta Beta Tau; member Pi Mu Epsilon, Phi Beta Kappa, Phi Eta Sigma; Pershing Rifles.

Odis P. McDuff, Gordo, Ala.—silver medal. Electrical engineering major; distinguished military student; Pershing Rifles; Secretary, Phi Eta Sigma; member Pi Mu Epsilon, Theta Tau.

Donald A. Swenson, Ft. Payne, Ala.—bronze medal. Physics major; member Pi Mu Epsilon and Sigma Phi Epsilon.

University of Arkansas

James V. Murphy, cadet lt. col., El Dorado, Ark.—gold medal.

University of Louisville: Roy S. Stieneker receives AFCA silver medal from Maj. Andrew J. Walton, USAF.

James B. Henry, cadet 1st sgt., Blytheville, Ark.—silver medal.

James W. Bean, Harrison, Ark.—bronze medal.

University of California

Jay F. Helms—gold medal.
John H. Ullman—silver medal.
Abbot M. Scheer—bronze medal.

University of Detroit

John L. Harned, cadet lt. col.—silver medal. Electrical engineering major; distinguished military student: executive officer, cadet corps; commanding officer, Major General Paul B. Wurtsmith Squadron, Arnold Air Society; member Tau Beta Pi, Eta Kappa Nu; secretary, junior class. Employed by Vickers, Inc., in the electrical instrumentation division during cooperative work periods.

University of Florida

Bruce E. Mathews, cadet 1st lt., Starke, Fla.—gold medal. Electrical engineering major; member Sigma Tau and joint student branch AIEE-IRE.

Robert A. Armstrong, Miami, Fla.—silver medal. Electrical engineering major; chairman, joint AIEE-IRE; member Sigma Tau.

University of Idaho

Cecil W. Hathaway, Moscow, Idaho—gold medal. Distinguished military student; member Sigma Tau and American Society of Civil Engineering; commissioned 2nd lt. USAFR.

Ralph D. Hamilton, Boise, Idaho—silver medal. Electrical engineering major; Phi Eta Sigma, Sigma Tau, Scabbard and Blade; member Beta Theta Pi.

University of Illinois

Winners not reported.

University of Kentucky

Roy P. Lambert, Albuquerque, New Mexico—gold medal. Company commander, Co. B, 1st Battalion, cadet brigade. Distinguished military stu-

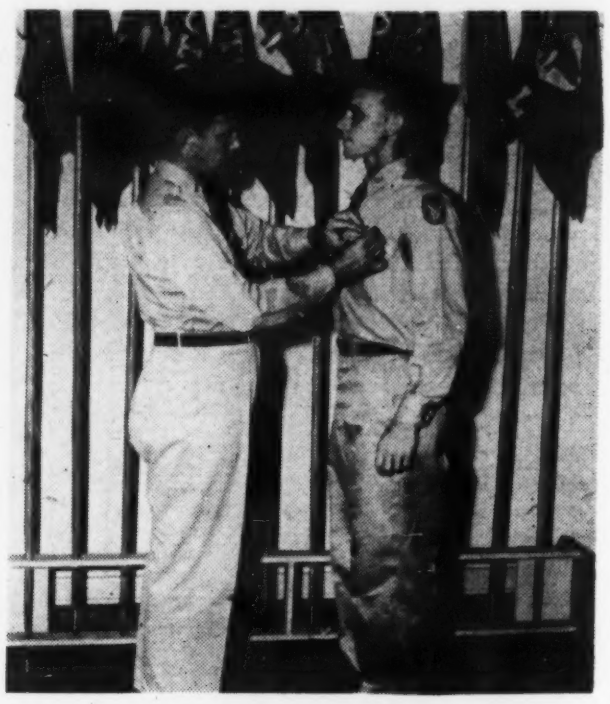
University of Pennsylvania: Ronald E. Stephans, USNR, is presented AFCA bronze medal by Capt. H. R. Stevens, USN.

University of New Mexico: James R. Park, winner of AFCA silver medal, receives award from university President Tom Popejoy.

New Mexico U: Jerry D. Wethington receives AFCA gold medal from Pres. Popejoy. Lt. Col. John L. Parker, PAS&T, looks on.

University of Florida: Robert A. Armstrong is presented the AFCA silver medal by CWO George L. Robbins.

Washington State College: Donald J. Goettel, AFCA gold medal winner, receives award from Dean Royal D. Sloan.



University of Florida: Bruce E. Matthews, winner of the AFCA gold medal, is presented award by CWO George L. Robbins.

University of Nebraska: Willis M. Schmeeckle is presented AFCA silver medal by Col. T. C. Cove, USAFR, pres. of Lincoln T&T Co.

Carnegie Tech: Raymond J. Ransil receives AFCA photographic award, presented by Pres. Fred Moran, AFCA Pittsburgh Chapter.

Washington State College: George W. Le Compte, AFCA silver medal winner, receives award from Professor Homer J. Dana.

AFCA GROUP MEMBERS

Communications—Electronics—Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation in our special fields.

Acme Telectronix
Altec Lansing Corporation
American Cable & Radio Corp.
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Institute, Inc.
American Radio Relay League
American Steel & Wire Company
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
Argus Cameras, Inc.
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.

Baltimore News Post
Barry Corporation, The
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporation, Inc.
Burnell & Company

California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Columbus Process Co., Inc.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.

Da-Lite Screen Co., Inc.
Diamond State Telephone Co.
DuMont, Allen B., Laboratories, Inc.

Eastman Kodak Company
Eby, Inc., Hugh H.
Electronic Associates, Inc.
Espey Manufacturing Co., Inc.

Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.

General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Insulated Wire Works, Inc.
General Instrument Corp.
General Telephone Corp.
Gilfillan Bros., Inc.
Graflex, Inc.
Gray Manufacturing Co.

Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hoffman Radio Corp.
Hycon Manufacturing Company

Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Indiana Steel Products Co.
Institute of Radio Engineers
International Resistance Co.
International Tel. & Tel. Corp.

Jacobsen Manufacturing Co.

Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.

Lavoie Laboratories
Leich Sales Corporation
Lenkurt Electric Company, Inc.
Lewyt Corporation
Loral Electronics Corporation

Machlett Laboratories, Inc.
Magnavox Company
Mallory & Co., Inc., P.R.
Martin, Glenn L., Company
Merit Transformer Corp.
Michigan Bell Telephone Company
Motorola, Inc.
Mountain States Tel. & Tel. Co.

National Company, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
Northwestern Bell Telephone Co.

Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Operadio Manufacturing Company

Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America
Pioneer Electric & Research Co., The
Precision Apparatus Co., Inc.

Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Ray-O-Vac Company
Raytheon Manufacturing Company
Reeves Instrument Corp.
Remington Rand, Inc.

Saxonburg Potteries
Sherron Electronics Co.
Simmon Brothers, Inc.
Smuckler & Company, Inc., A. F.
Society of Motion Picture Engineers
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Stackpole Carbon Company
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.

Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Transmitter Equipment Mfg. Co.
Tung-Sol Lamp Works, Inc.

United Radio Television Institute
United States Rubber Company
United Telephone Co.

Webster-Chicago Corporation
West Coast Telephone Co.
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company

dent; Scabbard and Blade; secretary, Tau Beta Pi; vice-president, Eta Kappa Nu; Sigma Pi Sigma; member IRE. Now employed by Sandia Corporation Co., Albuquerque, New Mexico.

McFarland W. Wood, Jr., Louisville, Ky.—silver medal. Cadet sgt.; distinguished military student; member IRE, radio club; "ham" radio operator, station WBKY; electrical engineering major.

Stanley S. Dickson, Jr., Paris, Ky.—bronze medal.

University of Louisville

Roy S. Steineker, cadet capt., Louisville, Ky.—silver medal. Veteran, 2 years service with Navy as aviation electronics technician. Commanding officer of Flight "A" in the corps of cadets; operations officer of Tommy Mantell Squadron of Arnold Air Society.

University of Maine

Victor O. Christensen, Yarmouth, Maine — gold medal. Engineering Physics major.

Raymond E. Robbins, Jr., West Tremont, Me.—silver medal.

Glenn E. Edgerly, Hallowell, Me.—bronze medal.

University of Michigan

Norman E. Boettcher—gold medal.
Fred M. Knipp—silver medal.
George F. Leydorf—bronze medal.

University of Minnesota

Marc C. Shoquist, cadet 1st lst., Forest Lake, Minn.—gold medal. Electrical engineering major; distinguished military student. Served in Navy during World War II with rank of petty officer 2nd class. Eta Kappa Nu; IRE. Commissioned 2nd lt. Signal Corps.

John M. Alton, Cadet S/Sgt., St. Paul, Minn.—silver medal. Electrical engineering major; member Arnold Society.

University of Nebraska

Wendall C. Bauman, cadet lt. col., Lincoln, Neb.—gold medal. Mechanical engineering major; distinguished military student; Pershing Rifles; Arnold Society of Air Cadets; member executive council of Candidate Officer's Association; American Society of Mechanical Engineers.

Willis M. Schmeeckle, cadet 2nd lt., Lincoln, Neb.—silver medal. During active duty in the Navy from June 1941 to January 1947 was awarded Distinguished Flying Cross, Air Medal with 6 Oak Leaf Clusters, Presidential Unit Navy Unit Citation, and following ribbons: American Defense, American Citation with 2 Oak Leaf Clusters, Theatre, Asiatic-Pacific Theatre with nint gold stars, Victory Ribbon and Good Conduct. Majoring in architecture.

Purdue University Student Chapter: Seated, L to R, Allen Borken, Norman Saunders (past president), Lt. Col. Norbert Miller and Capt. John Schatz (advisors), Harold Butler (secy-treas). Merrill Simon (vice pres.). Standing, L to R, Angelo Mazzei, Jake Latona, Kenneth Uran, Richard Massey, Paul Chasteen, David Prohaska, Charles Terrel (president), John Martin, Carl Dailey, John Davis, Stanly Kershaw.

University of New Mexico

Jerry D. Wethington, Delta, Colorado—gold medal. Served 14 months in the Air Force during 1945-46, attained rank of corporal. Mathematics major; distinguished military graduate; received regular commission in Air Force.

James R. Park, Puyallup, Wash.—silver medal. Served in Navy from 1945-49; attained rank of AT1/C; instructed electronics and radar for two year in Navy school; Electrical engineering major.

University of Pennsylvania

Albert E. Miller, III, Drexel Hill, Pa.—gold medal. Electrical engineering major. Commissioned ensign, U. S. Navy, upon graduation and reported for active duty to the USS *Siboney* (CVE-112).

Ronald E. Stephans, South Ozone Park, N. Y.—bronze medal. Electrical engineering major; member NROTC unit radio club.

University of Tennessee

Jesse A. Key, lt. col., Paris, Tenn.—gold medal. Chemical engineering major; distinguished military student; executive officer for cadet regiment which includes all ROTC units on campus; Tau Beta Pi, Alpha Chi Sigma, American Institute of Chemical Engineers, Scabbard and Blade, and Association of Collegiate Engineers. Commissioned in regular Air Force.

George A. Bradfute, Jr., cadet 1st lt., Knoxville, Tenn.—silver medal. Electrical engineering major; distinguished military student; platoon leader of cadet regiment; member Tau Beta Pi, Scabbard and Blade, Eta Kappa Nu; broadcasting and technical work for university FM radio station WUOT.

University of Tennessee: Left, Jesse A. Key, AFCA gold medal winner, and George A. Bradfute, Jr. awarded AFCA silver medal.

University of Washington

Elmer H. Green, Jr., cadet major, Seattle, Wash.—gold medal. Electrical engineering major; veteran of two years as Navy electronics technician. Arnold Air Society, Scabbard and Blade, Zeta Mu Tau; program chairman Joint AIEE-IRE; distinguished military student; received regular commission as second lieutenant, USAF.

John W. Benoit, cadet lt., Fairview, Montana—silver medal. Electrical engineering major; chairman, student branch, joint AIEE-IRE; vice-president, Zeta Mu Tau; recorder Tau Beta Pi. Held all-University honors in 1949 and 1950; achieved the high scholarship certificate awarded by the University this year.

University of Wisconsin

Melbourne E. Rabedeau, Kenosha, Wisc.—gold medal. Physics major; distinguished military graduate; cadet battalion commander; Scabbard and Blade; commissioned in regular Army.

John F. McNall, Madison, Wisc.—silver medal. Electricity major; Pershing Rifles; Varsity rifle team. Also awarded Chicago Tribune medal as outstanding 1st year advanced course cadet.

Thomas T. Thwaites, Madison, Wisc.—bronze medal.

Utah State Agricultural College

John D. Crane, cadet 1st lt., Salt Lake City, Utah—gold medal.

George H. Collier, cadet 2nd lt., Logan, Utah—silver medal.

Virginia Polytechnic Institute

Harold B. Phillips, cadet sgt., Whitacre, Va.—gold medal. Electrical engineering major; distinguished military student; member cadet honor court jury, Eta Kappa Nu, Omnicron Delta Kappa, AIEE; commissioned in regular Army.

William P. Brown, cadet cpl., Woodbridge, Va.—silver medal. Majoring in architecture; secretary, corps of cadets senate; member American Institute of Architects.

Donald G. Dudley, cadet pfc, Bethesda, Md.—bronze medal. Electrical engineering major; member AIEE; WUVT staff.

Washington State College

Donald J. Goettel, cadet lt. col., Spokane, Wash.—gold medal. Mechanical engineering major; distinguished military graduate; awarded American Legion Medal in sophomore year. Received regular commission in Signal Corps upon graduation.

George W. LeCompte, cadet 2nd lt., Tacoma, Wash.—silver medal. Electrical engineering major.

Darrel W. Scheffert, Le Center, Minn.—bronze medal. Veteran with 16 months service; on duty in Japan with Hq & Svc Gq, FEC; attained rank of staff sergeant.

West Virginia University

Robert G. Brake, cadet lt. col., Charleston, W. Va.—gold medal. Industrial engineering major; battalion commander in cadet corps. Veteran with eighteen months service in Signal Corps. Also awarded U. S. Veterans Signal Corps Association medal and Reserve Officers Association medal.

John H. Gallagher, Wheeling, W. Va.—silver medal. World War II veteran with eighteen months service in Navy as seaman 1st class. Electrical engineering major.

John R. Leeson, Fairmont, W. Va.—bronze medal. Mathematics major.

ARMED FORCES COMMUNICATIONS ASSOCIATION

(COMMUNICATIONS—ELECTRONICS—PHOTOGRAPHY)

1624 Eye Street, N.W.

Washington 6, D. C.

CONSTITUTION and BY-LAWS

Adopted April 29, 1947

Revised
May 11, 1948
March 28, 1949
May 12, 1950
April 19, 1951

For the information of our members there is published here our Association's Constitution and By-Laws to include latest revisions made at the 1951 Annual Meeting, April 19, at Chicago.

Separately printed copies of the Constitution and By-Laws will be mailed to any member of the Association upon request.

PREAMBLE

The Armed Forces Communications Association, organized in 1946 and incorporated under the laws of the District of Columbia, is a national society of American citizens working toward national security in the fields of communications, electronics and photography.

The Association endeavors to maintain and improve the cooperation between the Armed Forces and Industry in communications, and in the design, production, maintenance and operation of communications, electronics and photographic equipment in time of peace as well as in time of war.

The principal objective of the Association is an active membership of American citizens to whom the responsibility of training, production, maintenance and operation of this type of equipment falls in time of peace as well as in time of war.

The Association is entirely patriotic and non-sectarian; it has no commercial interests and no political alliances. It is not operated for profit and its income is expended in furthering its aims and purposes. Its elected officers serve without remuneration. All American citizens are eligible to membership.

SIGNAL, the journal of the Association, is published for the purpose of disseminating chapter news and other information of interest and importance to the members.

ARTICLE I

NAMES AND LOCATION

Sec. 1. The name of the Association shall be the Armed Forces Communications Association.

Sec. 2. The executive offices of the Association shall be in the City of Washington, District of Columbia.

ARTICLE II

MEMBERSHIP

Sec. 1. Membership in the Association shall be open to American industrial organizations and to all men and women who are American citizens and who are interested in furthering the objectives of the Association, with honorary memberships offered to certain citizens of foreign countries.

ARTICLE III

GOVERNMENT AND OFFICERS

Sec. 1. The government of the Association shall be vested in the Board of Directors, which may exercise all powers and do all such things as may be exercised or done by the Association, but subject, nevertheless, to the provisions of the statutes of the District of Columbia, the Certificate of Incorporation of the Association, and the Constitution and By-laws of the Association.

Sec. 2. The Board of Directors shall consist of 32 members, elected by the Council, each to serve without pay for a term of four years, and divided into four classes of eight members each, one class to retire at the end of the annual meeting each year, or upon the election and qualification of their successors. The Board of Directors shall have the power to fill casual vacancies in its membership and in all national offices of the Association, and to initiate executive measures necessary to achieve the objectives of the Association. The Board shall meet at least once each year, at the same time and place as the annual convention of the Association.

Sec. 3. The officers shall consist of a president, a first vice president, a second vice president and such additional number of vice presidents, not to exceed three, as may be authorized by the Board of Directors, and shall serve without pay. All officers (with the exception of the Counsel and the Executive Secretary) shall be elected by the Board of Directors at its annual meeting, from the active membership of the Board, to take office at the end of the annual meeting at which they are elected, and to serve for a term of one year following their election, or until their successors are elected and qualify.

Sec. 4. The Board of Directors shall at its annual meeting elect a Counsel to serve without pay for a term of one year beginning at the end of the meeting at which he is elected, or until his successor is elected and qualifies.

Sec. 5. The Board of Directors shall at its annual meeting appoint an Executive Secretary and Treasurer to serve for a term of one year beginning at the end of the meeting at which he is appointed, or until his successor is appointed and qualifies, and shall fix his annual salary for such period.

Sec. 6. Regular Service personnel shall not be eligibile to hold a paid national office in the Association while on active duty status.

Sec. 7. The Council of the Association shall consist of the members of the Board of Directors and one representative for each 100 members or fraction thereof in each chapter, provided however that no chapter shall have less than two chapter representatives, elected by the chapter members for a period of one year beginning on April 1st of each year. The national president of the Association, or in his absence the senior vice president present, shall serve as Council chairman.

The functions of the Council shall be to elect the Board of Directors and Honorary Members, and to make recommendations with reference to any proposed amendments to the Constitution. Chapters shall have power to fill unexpired terms of their Council representatives. The Council shall meet once each year at the time and place of the annual convention of the Association and at the hour designated by the Executive Committee. A majority vote of the members of the Council present shall be necessary for election to the Board of Directors. Members of the Council are eligible to be present at the annual meeting of the Board of Directors and to participate in the discussions, but shall not have the power to vote.

Sec. 8. There shall be an Executive Committee which shall consist of the President, the immediate Past President, and five other members of the Board, to be elected by the Board of Directors at its annual meeting for a term of one year beginning at the end of the annual meeting at which they are elected. The Counsel and Executive Secretary shall be eligible to attend meetings of the Committee, but shall have no vote.

The Executive Committee shall meet at least once each quarter, and at the call of the President or of any three of its members. It shall exercise the powers set forth in the Constitution and By-Laws, also the powers of the Board of Directors between meetings of that Board. All actions taken by the Executive Committee shall be ratified by the Board of Directors at its next subsequent meeting. The Executive Committee shall have the power to fill vacancies for unexpired terms. Notice in writing of the time and place of each meeting of the Executive Committee shall be sent to all members of the Committee at least ten (10) days prior to the meeting date.

Sec. 9. Special meetings of the Board of Directors may be called by the President, the Executive Committee, or any three members of the Board of Directors. Notices of such meetings shall be in writing and shall state the time and place of the meeting, and shall be sent to all Directors at least ten (10) days prior to the meeting date.

Sec. 10. Qualification of Directors and others shall be by acceptance within thirty (30) days by the Director or other persons elected or appointed.

Sec. 11. A quorum of the Council shall consist of 11 members; of the Board of Directors, 9 members; and of the Executive Committee, 4 members.

ARTICLE IV

MEETINGS

Sec. 1. The Association shall hold an annual meeting in the spring of the year at a time and place to be designated by the Executive Committee, which will cause to be prepared a program to include, where possible, the demonstration of such military and industrial communications, eletcronic and photographic equipment and training as may be authorized.

Sec. 2. The Association may hold such special meetings as may be called by the President or the Board of Directors or the Executive Committee.

ARTICLE V

CORPORATE OBLIGATIONS

Sec. 1. No obligation shall be incurred on behalf of the Association except by the Executive Secretary or by his written authorization and then only to the extent of funds in the Treasury available to meet the obligation. All obligations incurred by the Corporation shall be solely corporate obligations and no personal liability whatsoever shall attach to, or be incurred by, any member, officer or director of the Corporation by reason of any such corporate obligation.

ARTICLE VI

AMENDMENTS

Sec. 1. Amendments to this Constitution may be proposed by a majority vote of the Board of Directors or of the Executive Committee or upon petition addressed to the President and signed by not less than five percent of the total number of full members.

Sec. 2. Proposed amendments shall be submitted to the Council at any annual or special meeting for discussion and recommendations after which they shall be referred for final action to the Board of Directors, which may adopt them by a majority vote of the Directors present at any duly convened annual or special meeting at which a quorum is present.

BY-LAWS

1. AIMS AND PURPOSES

a. To preserve and foster the spirit of fellowship among former, present and future communications, electronics and photography personnel of Industry and the Armed Forces.

b. To commemorate the services rendered by the communication, electronic and photographic industries and of industrial personnel, and by the military personnel assigned to these activities in the wars in which the United States has been or may become engaged.

c. To promote efficiency in military communications, electronics and photography, especially through better liaison between Industry and the Armed Forces, as well as among the three Services themselves. This will include the maintenance of close relations between civilian scientists, engineers, manufacturers and operating companies and those concerned with similar activities in military, naval and air force communications, electronics and photography.

d. To bring to the attention of the membership through chapter meetings and the Association magazine, the importance of thorough cooperation between Industry and the Armed Forces in the communications, electronics and photographic fields.

e. To encourage adequate military training throughout the Nation, the upbuilding of adequate enlisted, and commissioned National Guard and Reserve forces, and effective industrial preparedness for war, in the fields of communications, electronics and photography.

2. CLASSES OF MEMBERSHIP

a. FULL MEMBERSHIP in the Association shall be open to all American citizens interested in advancing the aims of the Association—especially in communication, electronic and photographic phases thereof. Present and former military personnel and civilians employed in the electronic, photographic and communication industries, will be especially encouraged to become full members.

b. LIFE MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are interested in promoting the objectives of the Association. Life membership shall continue during the lifetime of the life member and shall expire at his death. It shall not be transferable.

c. STUDENT MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are students in the service academies, schools and colleges, and for one year after graduation.

d. GROUP MEMBERSHIP in the Association shall be open to all firms and companies controlled by American citizens who are interested in promoting the cause of industrial preparedness particularly in connection with communications, electronics and

photography, and with research, development, production, manufacture, operation, and supply of communication, electronic and photographic equipment. Group members shall have the privilege of nominating ten of their employees or officials who are American citizens, for full membership in the Association, and members thus nominated shall pay no individual dues.

HONORARY MEMBERSHIP in the Association may be proposed by at least three full or life members of the Association and a favorable vote by a majority of the Council voting shall be necessary for election.

Honorary Life membership shall be extended to all former Chief Signal Officers of the Army and Directors of Naval, Air, and Coast Guard Communications, and the Defense Department Directors of Communications, and shall be extended to the active officers in these positions as soon as they assume office.

Honorary membership shall be extended to the Chairman of the Joint Chiefs of Staff and to the Chiefs of Staff of the several Services during their tenure of office, and to such other public officials as the Executive Council may direct.

Citizens of foreign countries are eligible to Honorary Membership, either as Life Honorary or as annual Honorary Members, provided that if such a member later becomes a citizen of the United States of America his membership shall automatically change from Honorary to Life or Full, as the case may be.

Honorary members shall be entitled to all privileges of full membership except as otherwise provided in the Constitution and in these By-laws.

3. MEMBERSHIP INFORMATION—GENERAL

a. The term "members" except where specifically stated otherwise in the Constitution and in these By-laws shall mean full and life members only. Only these may vote or hold office.

b. The election to membership of all classes shall be by action of the Executive Committee, and the decision of that Committee as to eligibility shall be final.

c. Any person desiring to become a member shall make written application to the Executive Secretary. Said application shall be in such form and contain such data as may be prescribed by the Executive Secretary or the Membership Committee, in either case subject to the subsequent approval by the Executive Committee.

d. Any member may withdraw from the Association at any time by tendering his resignation in writing, but such resignation shall not become effective until said member shall have paid all obligations due the Association from him at the time of such resignation.

e. Any member may be dropped for cause by the vote of three members of the Executive Committee or, having been dropped, may be reinstated at the discretion of the Executive Committee.

f. All members are entitled to receive one copy of the Association publication for which $3.00 of the annual dues are charged—except that the entire $3.00 of student dues is for the publication.

4. MEMBERSHIP DUES

a. The fee for life membership in the Association shall be one hundred dollars (100.00) except for students in technical schools and the U. S. Military, Naval and Coast Guard academies for which the fee will be fifty dollars ($50.00).
For *full members*, five dollars ($5.00).
For *student members*, three dollars ($3.00).
For *group members*, two hundred dollars ($200.00), except for small business firms (with 500 or fewer employers) for which the annual dues are one hundred dollars ($100.00).

5. OFFICERS

a. The President shall have general supervision of the affairs of the Association and shall perform the duties usual to his office. He shall preside at the meetings of the Council, of the Board of Directors, and of the Executive Committee. He shall be *ex officio* a member of all committees and of all subcommittees thereof. In the absence of the President his duties shall devolve upon the Vice Presidents in order of seniority.

b The First Vice President shall have general charge of memberships and the activities of local chapters.

c. The Second Vice President shall have general charge of the activities of the National Advisory Committees.

d. The Counsel shall be the legal advisor to the Executive Secretary, the National Officers, the Executive Committee, and the Board of Directors.

e. The Treasurer shall be the custodian of the funds of the Association under the direction of the Executive Committee. He shall render an annual report and such special reports as may be called for by the Executive Committee. The accounts of the Association shall be audited annually by independent auditors. However, in the discretion of the Executive Committee, a certified public accountant designated by it may conduct the annual audit, his report to be made to the Executive Committee.

f. The Executive Secretary shall make collections and disbursements under the supervision of the Executive Committee; shall keep the roster of the members and the records of the status of annual dues; shall be the keeper of the seal of the Association; and shall have the custody of correspondence and records. He shall be responsible that suitable arrangements are made for the annual and other meetings of the Association, of the Council, of the Board of Directors, and of the Executive Committee, the proceedings of which he shall record. He shall submit an annual report to the Board of Directors at its annual meeting, and a quarterly report at the specified quarterly meetings of the Executive Committee.

The Executive Secretary shall be responsible for hiring and discharging the necessary National Headquarters personnel and for the management of the Executive Offices and shall have the power to contract in the name of the Association for such services and supplies as are necessary for its operation. He shall have administrative charge of the activities and national programs of the Association, of the Association's magazine SIGNAL, and of all other Association publications.

6. FISCAL YEAR

a. The fiscal year shall close on March 31, 1951 and on March 31 of each year thereafter.

7. CHAPTERS

a. Upon petition stating that not less than twenty-five (25) members of the Association in any locality desire to form a local chapter for the more intimate achievement of the purposes of the Association, the Executive Secretary of the Association shall immediately authorize a meeting for such inauguration, and assist in every way possible toward the organization of such chapter.

b Upon the formation of a new chapter, the Association will issue a suitable charter, signed by the National President and the Executive Secretary of the Association.

c. Every member of the Association, unless he desires otherwise, will automatically become a member of the local chapter of the territory in which he resides, but no person shall be a member of a local chapter who is not a member of the Association.

The local chapter may collect annually all dues, both original and renewal, for all of its individual and group members. The sum of $5.00 for each full member may be sent to National Headquarters, $1.00 of which will later be returned to the chapter. Or the sum of $1.00 may be withheld by the chapter for each full member and the remaining $4.00 remitted with the application form submitted by the member.

The annual group membership fee of $200.00 ($100.00 in case of small business), either original or renewal, shall be remitted to National Headquarters, and $25.00 ($10.00 in the case of small business) shall be distributed quarterly by National Headquarters to chapters, on a pro rata basis of paid membership at the end of the quarter previous to that in which the payment is made.

d. The constitution and by-laws of each local chapter shall be in the general form of that of the Association and shall be submitted to the Executive Secretary of the Association for review and shall be approved by him before becoming effective.

e. It shall be the general purpose of the chapters of the Association to bring their individual and group members into a closer fellowship with each other and with the communication, electronic and photographic personnel of the Armed Services. This can be accomplished through the medium of chapter meetings, visits to military establishments, industrial plants and laboratories, and through seminars and discussions consistent with the national policies and objectives of the Association.

r. Sub-chapters or posts may be organized by chapters of the Association. Such sub-chapters or posts will be chartered by the parent chapter with an initial membership of at least five members of the Association in good standing. All applications and dues of such members will continue to be handled by the National Headquarters.

g. Student chapters may be organized at any college or university in the United States which carries electronics or communications courses in its curriculum.

A minimum of 10 student members may file petition for a student charter. This charter will be issued by National Headquarters in accordance with Sec. b of this By-law.

8. RESTRICTIONS

a. No member of the military establishment of the Army, Navy, Air Force, or Coast Guard shall be employed by the Association in a paid capacity, except that articles written for publication may be paid for with the approval of the Executive Secretary.

9. NOMINATIONS AND ELECTIONS

a. On or before March 1st each year the President shall appoint a nominating committee, composed of not less than three nor more than five members of the Association. This committee shall draw up a slate of nominations for members of the Board of Directors to fill the vacancies which will occur in that year. On or about March 1st the Executive Secretary shall notify all Directors and Council representatives that nominations for new Directors are in order and shall request that the Council members submit to the chairman of the nominating committee such names as they desire to nominate for the Director vacancies to be filled.

Any group of twenty or more members in good standing of the Association may submit to the chairman of the nominating committee the name of a candidate or list of candidates, for membership on the Board of Directors. Such a petition shall be in the hands of the nominating committee at least four weeks before the annual meeting. If any person or persons so proposed is not included by the nomating committee in its list of nominations, then any member of that group proposing such person or persons may place his or their names in nomination before the Council at the same time as the names of those nominated by the nominating committee. No other person shall be voted upon or eligible for election as a director. Those candidates receiving the highest number of votes shall be declared elected.

After the nominees are selected and after ascertaining if the proposed candidates will accept the posts indicated, the chairman of the nominating committee will submit the list of candidates for directors, at the annual meeting of the Council for appropriate action.

The officers of the Association will then be elected by the Board of Directors at their annual meeting. A majority of the Directors present shall be necessary for the election of any officers or member of the Executive Committee.

10. AMENDMENTS

a. The Board of Directors shall have the power to adopt and amend the By-laws by a majority vote of those present at any annual or special meeting of the Board.

11. INSIGNIA

a. The insignia or emblem of the Association shall consist of:

1. The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America insofar as national defense and especially modern communications are concerned—our basic reason for existence. The border consists of leaves of the olive branch of peace showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signaling in the U. S. Signal Corps and a method still used for special purposes by the Navy. Just above the eagle and between his outstretched wings, is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, Marine and Naval aviation, both intra- and inter-aircraft, air-ground and on the ground. Above that is a radar antenna array and at the very top a radio relay antenna—for the latest major step in military communications. In the color version there are the traditional colors of the signal flags—dexter white flag with red center and sinister red flag with white center—with a gold border to the whole.

2. Insignia in this form with ribbon and modifications of it in the form of pins, badges, buttons and rings, shall be authorized by the Board of directors for use of members. The ribbon shall be in two equally wide stripes of orange and blue.

b. The flag of the Association shall be the above insignia superimposed upon a field of sky blue cloth—representing the medium through which modern signals are transmitted. Under the insignia shall be a scroll on which shall be inscribed "National Security through Military Preparedness."

12. NATIONAL ADVISORY COMMITTEES

a. Members of the Association shall be eligible for membership on National Advisory Committees devoted primarily to the problems of the Armed Services and to the advancement of knowledge, engineering practices and production and design techniques relating to the special fields of communications, electronics or photography and to activities of the Association.

b. These committees shall be organized in conformity with conditions in each particular field rather than according to any standard pattern.

c. Each committee shall have a chairman selected by the President of the Association and approved by the Executive Committee. The other members shall be designated by the chairman. Through meetings, conferences and discussions and in cooperation with local chapters, they shall keep the membership in close contact with progress and developments in their specific fields. They shall meet as committees from time to time to initiate recommendations or reports and shall be available in an advisory capacity on such matters as may be presented for their study and report by the Armed Forces or the Association.

CHAPTER NEWS

Atlanta

Communism in Europe was the subject of an address by Dr. Marcus W. Collins, professor of sociology, Atlanta Division of the University of Georgia, at the chapter's spring dinner-meeting on April 16th.

Special guest of the chapter was Lieut. General John R. Hodges, commanding general of the Third Army, who gave a brief talk stressing the importance of communications in modern warfare.

New chapter officers were elected for the ensuing year as follows: president—Col. Clyde R. Smith, deputy signal officer, Third Army; 1st vice-president—Lt. Col. Arry L. Brown, local radio station executive; 2nd vice-president—P. R. Curry, Western Electric Co.; 3rd vice-president—Robert J. Smith, Atlanta General Depot; 4th vice-president—Robert H. Harris, Georgia Tech; secretary-treasurer — Capt. Collins L. Cochran, Sig. Sec. Third Army.

The meeting was presided over by Chapter President Ralph Grist of Southern Bell Tel and Tel, and was attended by one hundred members and guests.

Augusta-Camp Gordon

The May meeting of the Augusta-Camp Gordon Chapter was held on the 17th to coincide with Armed Forces Week. Colonel Stephen McGregor USA(Ret.), civil defense director of Augusta, who had just returned from Washington where he attended a national conference of civil defense directors, was the speaker of the evening. He recounted the highlights of the Washington conference and reported on the progress of the civil defense effort in the Augusta area. At the conclusion of his talk, Colonel McGregor was assured of the support of the chapter and was asked to call on it for any assistance within its power to render.

Chapter President Norman Kinley gave an informal report of the events of the national convention which he and Hugh Fleming had attended in Chicago, and displayed the certificate of honorable mention in the Chapter of the Year contest which had been awarded to the Augusta-Camp Gordon Chapter. With the concurrence of the members present, the certificate was turned over to the custody of Col. Henry J. Hort, commanding officer of the Signal Corps replacement training center and past president of the chapter.

A demonstration of the capabilities of the tape recorder was very ably presented by Cpl. Stanley W. Salter, sound technician with the 301st Signal Photo Company. Corporal Salter, who had done extensive free lance commercial recording prior to entering the service, began his demonstration with an account of the development of the process. One interesting point made was that during World War II Germany had developed its recorders to such a high state of fidelity that Adolph Hitler was able to fool Allied Intelligence by recording speeches for delayed broadcast from Berlin stations. Not being able to detect that it was a recording, it was frequently assumed that Hitler was in Berlin when actually he was elsewhere.

Corporal Salter played back many of the recordings he had made under varied conditions and his presentation convinced the audience that the uses of the tape recording device have not yet been fully exploited and that it is a great scientific advancement in the communications field.

At the conclusion of the demonstration the members gathered in the television room of the Camp Gordon demonstrator building for informal discussion and refreshments.

Baltimore

Aboard the destroyer escort USS *Herringer*, 69 members and guests of the Baltimore Chapter weathered a terrific rainstorm to make a tour of the upper harbor of the Chesapeake Bay from 3:00 P.M. to 7:30 P.M. on May 23rd. The trip was made possible by the U. S. Naval Reserve Training Center at Fort McHenry in Baltimore.

During the trip, members of the ship's crew conducted tours throughout the ship explaining the operations of the many pieces of equipment and considerable interest was shown in the communications and navigation equipment.

Since it was impossible to provide a dinner for the AFCA members and guests, the program committee arranged for a caterer to provide box lunches at a nominal charge. The facilities of the ship in the crew's quarters, or mess, were turned over to the group for lunch, which was a highlight for many of those present who had never been below the main deck of a war ship.

Despite the inclement weather, the crew conducted several special drills such as "Battle Stations," "Fire Detail," etc., for the benefit of the chapter members and guests.

An interesting demonstration of three dimensional pictures featured the chapter's June 20th meeting in Levering Hall, Johns Hopkins University. Mr. A. Gammerman of the Gammerman Photo Supply Company and several representatives of the Three Dimension Company conducted the demonstration. This presentation included a speaker who outlined the various techniques involved in the production of three dimensional film.

During the business portion of the

Chapter of the Year, 1951

SACRAMENTO

President—Paul W. Carrington
Past. Pres.—Milton G. Mauer
Secretary—C. A. House

meeting the following officers were unanimously elected to head the chapter during the coming year: president—Col. Henry W. Williams, Chesapeake & Potomac Telephone Co.; vice-presidents—George C. Ruehl, Jr.; Col. James D. O'Connell, signal officer Second Army; Capt. Richard E. Elliott, commanding officer, U. S. Naval Communications Station, Annapolis; secretary—Donald C. Lee; treasurer—Plummer Wiley. E. K. Jett and W. L. Webb were elected national council members.

Col. George Dixon, AFCA executive secretary, who had come up from Washington for the meeting, congratulated outgoing Chapter President Webb on the excellent activities of the chapter during the past year. He suggested that the chapter executive committee consist of the past presidents and present officers who should get together during the summer months and formulate plans for the next year. He also stressed the need for more group and individual members in the association.

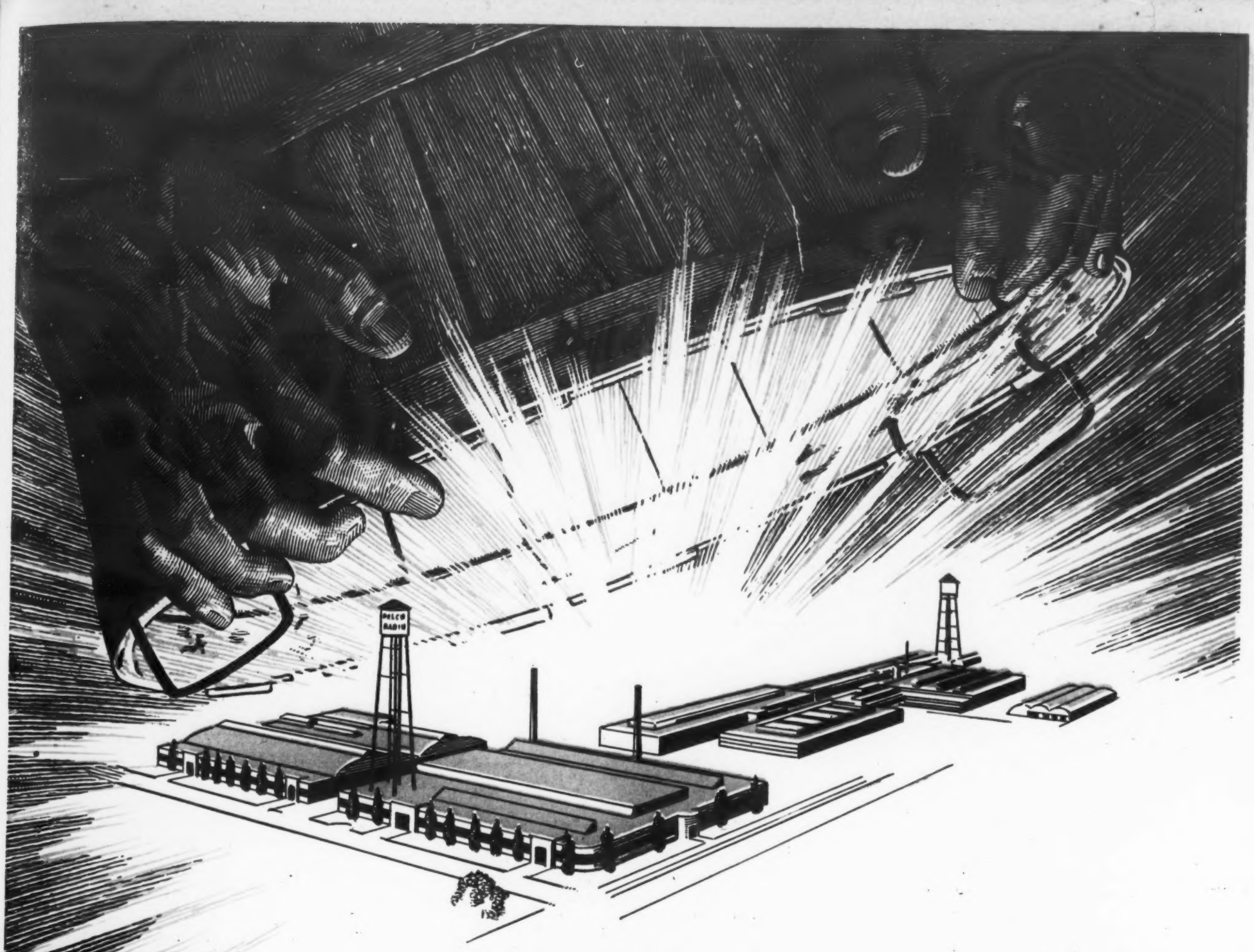
The gavel was turned over to the new president, Col. Williams, who presided for the remainder of the meeting. Annual reports of the secretary and treasurer were read and approved and committee reports were submitted. Membership chairman Harold W. Giesecke pointed out the increase in chapter membership from 94 to 130 during the past year. Program chairman Donald Lee thanked his committeemen for their assistance in providing the excellent programs and outgoing President Webb expressed his appreciation to all his co-workers and members for their assistance in making the meetings during the past year so successful.

Boston

Following a social hour and buffet dinner at the Boston Naval District headquarters on May 21st, Boston Chapter members devoted the balance of the evening to an open forum discussion of chapter affairs.

Measures for increasing attendance at meetings were discussed. A number of constructive suggestions were advanced particularly toward wider publicity coverage and for personal contact with new and prospective members. It was decided to publish a local membership list so that each member could make it a point to get to know all other members in the chapter.

Program plans came in for considerable discussion. Long range planning



WE'RE LIFTING THE BUSHEL BASKET— AND LETTING OUT OUR LIGHT!

Probably you didn't know it because we haven't told you. BUT—for the past five years we've been building car and truck radios for General Motors. In 1950 alone we built nearly 2,000,000 radios for practically all types of vehicles. Our production tops that of any other car radio manufacturer.

Since we stopped making radio and electronic equipment for the armed forces during World War II, we've concentrated on making our facilities the largest and our products the finest in the industry. Unlike most others, we're not just an assembly plant. We make practically all the parts that go into our products. Our design and research engineers are tops in their field. Our laboratory and production equipment is the finest that can be obtained.

With our vast experience, our facilities, engineering know-how, our productive manpower bigger and better than ever before, we believe we can be of service to our country. We are ready to go to work immediately for national defense and count it a privilege to volunteer for service.

Delco Radio

DIVISION, GENERAL MOTORS CORPORATION

KOKOMO, INDIANA

CHAPTERS

National Director of Chapters: Joseph C. Wilson, The Haloid Co., Rochester 3, N. Y.

AREA REPRESENTATIVES FOR CHAPTERS

Area A: George W. Bailey, IRE, 1 E. 79th St., New York, N. Y. *New England States, New York, New Jersey*

Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. *Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia*

Area C: Ralph S. Grist, So. Bell T&T Co., Atlanta, Ga., *Southeastern States along Atlantic and Gulf coasts—from North Carolina to Louisiana including Tennessee*

Area D: E. H. Mittanck, 711 Telephone Bldg., Dallas, Tex. *New Mexico, Texas, Oklahoma, Arkansas*

Area E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado*

Area F: H. L. Hoffman, 3761 S. Hill St., Los Angeles, Calif. *Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington*

CHAPTERS: PRESIDENTS AND SECRETARIES

ATLANTA: President—Col. Clyde R. Smith, SigC, 3rd Army, Ft. McPherson, Ga. Secretary—Collins L. Cochran, SigSec, Hqs 3rd Army, Ft. McPherson, Ga.

AUGUSTA-CAMP GORDON: President—Norman J. Kinley, 164 E. Hancock Dr., Augusta, Ga. Secretary — Leonard Carlson, SCTC, Camp Gordon, Ga.

BALTIMORE: President—Henry W. Williams, 3953 Cloverhill Rd., Baltimore, Md. Secretary—Donald C. Lee, Westinghouse Elec. Corp., 2519 Wilkens Ave., Baltimore, Md.

BOSTON: President—T. F. Halloran, General Communication Co., 530 Commonwealth Ave., Boston, Mass. Secretary — Mark T. Muller, Asst. PMS&T, M.I.T., Cambridge, Mass.

CHICAGO: President—John R. Howland, Stewart-Warner Corp., 1826 Diversey Phwy, Chicago, Ill. Secretary—Raymond K. Fried, 111 W. Monroe St., Chicago, Ill.

CLEVELAND: President — Lee J. Shaffer, 820 Superior Ave., N. W., Rm. 205, Cleveland, Ohio. Secretary—T. F. Peterson, American Steel & Wire Co., 1434 Union Commerce Bldg., Cleveland, Ohio.

DALLAS: Acting President— E. H. Mittanck, 711 Telephone Bldg., Dallas, Tex.

DAYTON-WRIGHT: Acting President—Steve J. Gadler, 1524 Gummer, Dayton, Ohio.

DECATUR: President—Robert J. Bangert, 1110 Albert St., Decatur, Ill. Secretary—O. D. Allinson, 340 S. 23rd St., Decatur, Ill.

EUROPEAN: President — I. P. Doctor, SigO, Frankfurt Mil. Post, APO 757, New York. Secretary—C. E. Laurendine, Comm. Gp., Bi-Partite Control Office, APO 757, New York.

FAR EAST: Acting President—Brig. Gen. Elton F. Hammond, SigSec, GHQ, FEC, APO 500, San Francisco.

FORT MONMOUTH: President — Eugene A. Kenny, 11 Allen Ave., Fort Monmouth, N. J. Secretary—Mervin C. Bowers, 35 Russel Ave., Ft. Monmouth, N. J.

GULF COAST: President—John A. McDavid, 3380th TT Gp., Keesler AFB, Miss. Secretary—Lloyd E. Sunderland, OMR #680, Keesler AFB, Miss.

GREATER DETROIT: President—R. Foulkrod, Michigan Bell Tel. Co., 333 State St., Detroit, Mich. Secretary—D. J. Basolo, Michigan Bell Tel. Co., 1365 Cass Ave., Detroit, Mich.

KENTUCKY: Acting Pres.—Harry Bradshaw, 110 Delmont Drive, Lexington, Ky. Secretary—Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: President—Peter M. Miller, Jr., 1936 Robert St., New Orleans, La. Secretary—A. Bruce Hay, Southern Bell Tel & Tel Co., 520 Baronne St., New Orleans, La.

NEW YORK: President — Ellery W. Stone, American Cable & Radio Corp., 67 Broad St., New York, N. Y. Secretary—David Talley, International Tel & Tel Corp., 67 Broad St., New York, N. Y.

PHILADELPHIA: President—Harry A. Ehle, Int'l Resistance Co., 401 No. Broad St., Phila. Secretary—R. G. Swift. Diamond State Tel. Co., 1835 Arch St., Philadelphia, Pa.

PITTSBURGH: President—S. C. Stoehr, Jr., 2546 Pioneer Ave., Pittsburgh, Pa. Secretary—Robert J. Campbell, 105 Woodside Rd., Pittsburgh, Pa.

RICHMOND: Acting President—E. T. Maben, Chesapeake & Potomac Tel. Co., 703 E. Grace St., Richmond, Va.

RIO: Acting President—Herbert H. Schenck, Caixa Postal 709, Rio de Janeiro, Brazil.

ROCHESTER: President—Joseph C. Wilson, The Haloid Co., Rochester 3, N. Y. Secretary—R. G. Bowie, Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

SACRAMENTO: President—Paul W. Carrington, 1100 Lochbrae Rd., No. Sacramento, Calif. Secretary—C. A. House, Sacramento Signal Depot, Sacramento, Calif.

ST. LOUIS: Acting President—G. E. Popkess, Jr., 35 Lindorf Drive, E. St. Louis, Ill.

SAN FRANCISCO: President—Harry E. Austin, RCA Communications, Inc., 28 Geary St., San Francisco, Calif. Secretary—William G. Damerow, 1625 Pacheco St., San Francisco,

SEATTLE: President—Marshall B. James, 1817 28th Ave. W, Seattle, Wash. Secretary—Merrill R. Stiles, 916 W. 122nd, Seattle, Wash.

SOUTH CAROLINA: President — John L. H. Young, 34 Chalmers St., Charleston, S. C. Secretary—Carl A. Newman, 2807 Monroe St., Columbia, S. C.

SOUTHERN CALIFORNIA: President — Arthur C. Hohmann, City Hall, Los Angeles, Calif. Secretary—Richard F. Walz, 5808 Marilyn Ave., Culver City, Calif.

WARREN, F.E.-CHEYENNE: President—Roderick E. Lacy. Secretary — Thaddeus D. Byars, Francis E. Warren AFB, Cheyenne, Wyo.

WASHINGTON: President—Percy G. Black, 906 Munsey Bldg., Washington, D. C. Secretary—W. P. Dutton. RCA Victor Div., 1625 K St. N.W., Washington, D. C.

STUDENT CHAPTERS

CORNELL UNIVERSITY, Ithaca, N. Y. .

NEW YORK UNIVERSITY, New York, N. Y. President—William S. Furman, 225 Sedgwick Ave., New York, 53, N. Y. Secretary—Martin Polan.

OHIO STATE UNIVERSITY, Columbus, O. President—Raymond E. Spence, Jr.; Secretary—Robert Borden.

OKLAHOMA A & M COLLEGE, Stillwater, Okla.

PURDUE UNIVERSITY: Lafayette, Ind. President—Charles Terrell; Secretary—C. Harold Butler.

STATE COLLEGE OF WASHINGTON, Pullman, Wash.

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Texas. President—Arthur Seybold; Secretary Frank N. Foster.

UNIVERSITY OF ALABAMA: University, Ala.

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

UNIVERSITY OF ILLINOIS: Urbana, Ill. President—Donald A. Jackson; Secretary—Milton F. Langer.

UTAH STATE AGRICULTURAL COLLEGE: Logan, Utah.

National Headquarters Chapters Secretary: Julia B. Godfrey

CHAPTER NEWS

for meetings and speakers were suggested, with greater use of speaker material from among AFCA members. It was felt that the majority of members would be interested in hearing speakers from the various Armed Forces procurement agencies on the subject of securing government contracts by small business and the mechanics of procurement. Additional comments offered were that meetings should feature two speakers to balance the program—one to discuss a specialized subject and the other to present a topic of general interest to all members.

A vote of confidence was given the chapter officers and it was decided to hold meetings every two months, except in July and August, and the third Thursday of the month was selected as the regular meeting date.

Chicago

The Chicago Chapter held its prevacation meeting on May 31st at the Svithiod Singing Club where arrangements were made for reception and dinner through the courtesy of William C. DeVry, president of DeVry Corporation, who thoughtfully provided added attractions to the regular program. Music during the dinner hour was one of these attractions, and the other, in timely keeping with the baseball surge in Chicago, was Lew Fonesca, promotion director of both major leagues, who proved to be a popular after-dinner speaker with his inside angles on baseball.

On the serious side, a brief business meeting preceded the main program. Col. Norman H. Saunders, chairman of the chapter nominating committee, presented the committee's recommendations, and officers were elected for the fiscal year ending May 31, 1952. President is Col. John R. Howland, director of product research of the Stewart-Warner Corp. He succeeds Oliver Read, editor of Radio and Television News, who was given a standing tribute for his leadership in building the chapter over the past two years. Vice-presidents are: Dwight Brown of Illinois Bell Telephone Co., William DeVry, James H. Kellogg of Kellogg Switchboard and Supply Co., and Car-

HERE is an optimist—and a pessimist.

One believes we're living in a grand world. The other thinks it's dropping apart. One sings, the other broods—yet they're in a swell place for a wonderful duet.

Because they live in America.

America is the land of freedom. Freedom of private initiative. Freedom of opportunity. Freedom to choose our leaders. So much freedom to do things the way we want to do them.

"Who's '*we*'?" asks the pessimist.

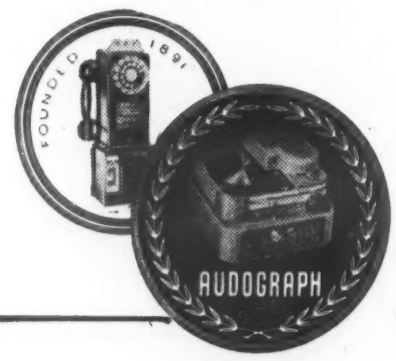
Labor . . . Management . . . Government . . . the millions of shareholders of our land, banded together by a common interest in the common welfare.

American men and women who know punitive laws or taxes against one group hurt all groups. People who know the American system depends upon profit incentive. Citizens who realize individuals and corporations alike *must* be allowed to save for the future—if we are to have a future. People who know free enterprise is the best defense against all "isms" ever invented.

That's "we"!

Our capitalistic world isn't perfect. But at least we are permitted to know what is going on. We have the right to do something about it. Working together, we *can* plan our present and future . . . and what other people can make that statement?

There's at least one note on which optimists and pessimists can sing in harmony—America is the *only* place to live in the 20th Century A.D.



Walter E. Dittmars

President, The Gray Manufacturing Company
Hartford, Connecticut

rington H. Stone. Secretary-treasurer Raymond K. Fried was re-elected. Chapter directors are: Ralph Brengle, Dwight Brown, C. G. Duncan-Clark, Bennett W. Cooke, Raymond K. Fried, Theodore S. Gary, John R. Howland, James H. Kellogg, Frank Meade, Oliver Read, Carrington Stone, and Col. Samuel R. Todd. Messrs. Fried, Gary and Read were elected national council members.

The program, featuring armed forces 16mm motion picture projection equipment, was opened with a word of welcome from Mr. DeVry who introduced E. W. D'Arcy, chief engineer of the DeVry Corporation, as the evening's speaker.

Mr. D'Arcy sketched the history and business philosophy of the DeVry Corporation since its founding in 1913 by H. A. DeVry, with emphasis on invention and development. The company was a pioneer in the audio-visual field and developed the first 35mm portable projector. Long before World War II, its attention had been turned to motion picture uses other than in the entertainment field. When the emergency came, the company was able to produce training films that were effective for the services. One example was a training film to teach the fundamentals of gunnery that did the job and saved the cost of a great deal of ammunition.

In 1944, the armed forces expressed interest in developing a 16mm motion picture projector that would be portable and stand rough usage. A contract with DeVry Corporation in 1945 led to research and improvements that met the required tests and resulted in production in late 1949 of the desired projector and standardization of its components.

The DeVry Corporation is proud of the product and terms it the first professional 16mm sound motion picture projection equipment. Its sturdiness is demonstrated by the fact that it can withstand hours of severe vibration and can be dropped repeatedly on a concrete floor from a height of 18 inches without damage. It is also fungus-proof. Performance superiority of the equipment is based on improvements in illumination, picture steadiness, low distortion sound reproduction, low noise level, and maintenance of projector speed over variations in line voltage.

An Army training film, showing the common mistakes made in handling the 16mm projector and how they can be eliminated or corrected, was shown through a DeVry machine to illustrate Mr. D'Arcy's talk.

As a conclusion both to the meeting and the past year, Ollie Read handed over his office as president to John Howland who set the keynote for chapter activities in the coming year with the following remarks:

Philadelphia Chapter meeting. C. A. Freehafer, vice pres., Bell Tel. Co. of Pennsylvania, explains operation of equipment to one of many AFCA groups touring telephone plant. In center foreground, Col. Glenn S. Meader, C.O., SigCorps Stock Control Agency; and T. A. Smith, RCA engineering products dept.

"Planning for the progress of military preparedness and for catering to the needs of the public at the same time has been immeasurably easier because the persons who did such planning have maintained a basis of contact and have been in a position to appreciate each other's problems. Our association makes such liaison possible, and has been tremendously effective within the scope of its activity. We need broader cooperation from industry in making our work even more effective. We need not only new group member companies but also activity by more people within each member company. Cooperation among the several segments of our membership, and the contacts upon which understanding can be based prior to the writing of formalized directives are essential today to industry and the armed forces. These objectives are no task for a small group of men. but our entire chapter membership can preach this gospel and prove the value of meeting our emergency in this way while the nation is probably to be neither in a state of peace nor in a state of war in the year ahead."

Cleveland

Directors whose terms will expire in 1953 were recently elected as follows: D. H. Endress, Willard Storage Battery Co.; T. F. Peterson, Preformed Line Products Co.; L. A. Thompson, Acme Telectronix Laboratory; L. K. Wildberg, Radiart Corporation.

The other members of the board whose terms expire in 1952 are: L. A. King, Rola Co.; W. McClusky, Citizens Telephone Co.; G. F. Prideaux, General Electric Co.; V. G. Krebs, National Advisory Committee for Aeronautics; L. J. Shaffer, Ohio Bell Telephone Co.

An annual report was submitted to all chapter members reviewing the Cleveland Chapter's activities during 1950-51, which included three regular meetings, one joint meeting with the AIEE and one with the IRE. The chapter renewed affiliation with the Cleveland Technical Societies Council and Chapter President Lee Shaffer attended six meetings of its Board of Governors as the AFCA chapter representative. Chapter Secretary T. F. Peterson attended the armed forces-industry conference held in Washington in May.

Decatur

A joint meeting of the Decatur Chapter and the University of Illinois Student Chapter on May 15th featured an authoritative discussion on color television by W. L. Everitt, dean of the College of Engineering, University of Illinois, who is a member of the President's communications policy board and a member of the advisory committee on color television of the Interstate and Foreign Commerce Committee of the U. S. Senate.

Dean Everitt discussed the principles of sending and receiving pictures and the problems that have been encountered in developing equipment good enough to be acceptable to the general public. He pointed out that one of the greatest problems was that of arriving at a state of perfection so that, once the system is installed, it will not be necessary to make radical engineering changes which will affect the commercial producer of television units. Another engineering problem, said Dean Everitt, is that of having a system which will permit over-all coverage to all areas. He stated that the present status of development had not produced a satisfactory answer to these major problems and, therefore, he had no answer as to when color television would be made available to the general public on a commercial scale.

The dinner meeting was held at the University of Illinois YMCA and was attended by some seventy members and

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Complete assemblies with Permendur, steel or aluminum bases, inserts and keepers as specified. Magnetized and stabilized as required.

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guests. Col. K. S. Stice, USA(ret.), was in charge of arrangements. Among those present were the following top-rank officers from the Decatur Signal Depot: Lt. Col. John F. McCarthy, commanding officer; Lt. Col. Jack N. Nahas, deputy commanding officer; and Lt. Col. Alex W. Hazuda, executive officer. Robert Bangert, president of the Decatur Chapter, and Donald Jackson, president of the University of Illinois Student Chapter, presided as joint chairmen of the meeting.

Decatur Chapter's May meeting at U of Illinois featured talk by W. L. Everitt, dean of the university's college of engineering, who is a member of the President's communications policy board and of the advisory committee on color television of the Senate's interstate and foreign commerce committee.

Fort Monmouth

The Fort Monmouth Chapter concluded its season of activities on June 29th with a clambake "on the house" for its members.

One hundred eighty members turned out for the affair, and the chapter reports "the sea food was delicious, the evening a huge success and definitely a grand ending of the season's social events."

The chapter is losing its live-wire secretary, Lt. Col. Mervin C. Bowers, who is being assigned to a ten-months' course at the Naval War College in Newport, Rhode Island. A successor to Col. Bowers has not yet been selected.

Gulf Coast

The Gulf Coast Chapter, which has already put in its bid for the 1952 Chapter of the Year title by running in the lead for the first three months of the contest, held its regular monthly meeting on May 18th at the Paradise Point Restaurant, Mississippi City.

Capt. R. P. Deane gave a report on the national convention in Chicago which he and Capt. T. G. Cline had attended as chapter representatives. At the conclusion of the report, Captains Deane and Cline were unanimously elected national council members from the chapter for the current fiscal year.

A program committee was appointed as follows: Maj. R. A. Krutz, chairman; J. C. Dabney, Capt. R. P. Deane and A. J. Overmyer. A discussion was held on the type of programs to be featured at future meetings. The date for the monthly meetings was set as the Friday night closest to the middle of the month and it was agreed that a dinner should precede each meeting.

At the conclusion of the business session, Mr. R. G. Butler, guest speaker, gave an interesting discussion on the history and need for communications.

An account of an inspection tour of electronics training and research facilities in Germany last summer was given by Dr. Fett, electronics professor at the University of Illinois, before the June 15th meeting of the chapter. Dr. Fett had made the tour under the auspices of the State Department and had many interesting experiences to relate.

Chapter President Colonel John McDavid announced the following membership committee which will conduct a campaign to increase the chapter strength: Lt. Col. E. A. Wood, chairman; Maj. D. M. Mulcahy; and Capt. R. P. Deane. Several civilian members will also be appointed to serve on the committee.

The evening's program was concluded with the showing of two Bell System films.: one on the laying of the cable from Florida to Havana, and the other on the transmission lines and facilities made available to the television networks by the Bell System.

The meeting took place in the Magnolia Room of the White House Hotel in Biloxi. A number of new members in attendance were introduced to the chapter by Captain Deane.

New York

Featuring photography in joint session with the Atlantic Section of the Society of Motion Picture and Television Engineers on May 23rd, the New York Chapter concluded a highly successful season and adjourned activities until the fall.

The speaker of the evening, Dr. Walter Clark, director of the Eastman Kodak Laboratory, was introduced to the audience by Mr. M. E. Stifle of Eastman Kodak who is chairman of the Atlantic Section of the SMPTE. In introducing Dr. Clark, Mr. Stifle spoke of the close relations in the photographic field between the SMPTE and the AFCA.

Dr. Clark presented a most interesting talk on "Tropical Photography," illustrated by colored slides and colored motion pictures. He described the special research laboratory established by Eastman Kodak adjacent to the Panama Canal. Located in Panama because of the very high humidity and temperatures existing there, the laboratory affords facilities for making extensive research studies on photographic processes in the tropics. Some methods have been evolved to improve the preservation of photographic negatives and prints in tropical climates. Dr. Clark's motion pictures included many interesting and amusing scenes of animals found on the island on which the laboratory is located.

The chapter was brought up to date on national AFCA affairs by Executive Secretary George P. Dixon who came up from Washington for the meeting.

A report on the presentation of the AFCA-Signal Corps photographic contest awards to local ROTC winners was made by Lt. Col. Ludwig R. Engler, chairman of the chapter's reserve affairs committee. New York University ROTC cadets won first and third prizes in the national contest and Lt. Col. Engler made the presentations on behalf of the association.

Col. Ted L. Bartlett, AFCA chapter vice-president, presided in the absence of Chapter President Ellery Stone who was out of town on business.

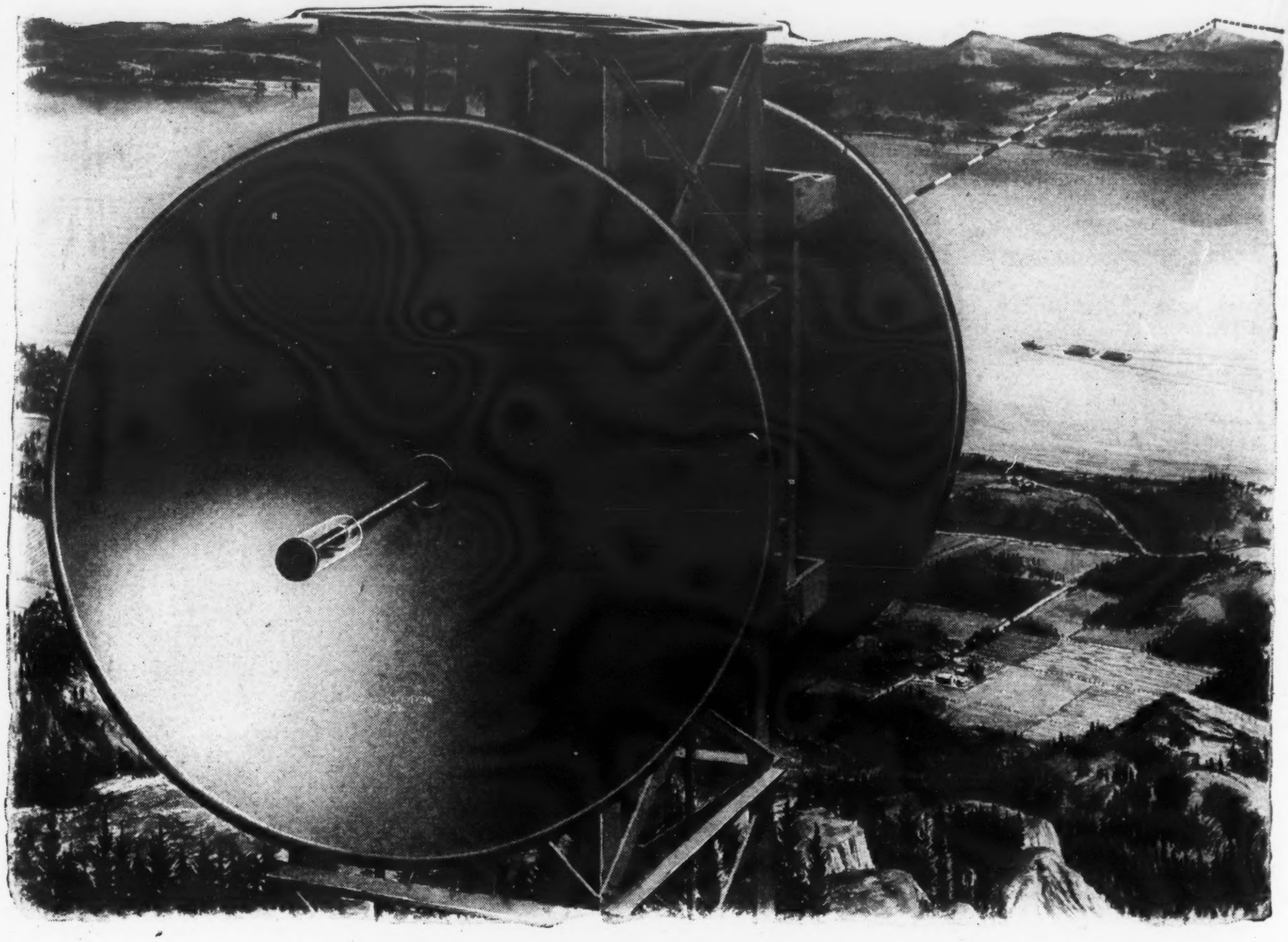
Philadelphia

In accordance with the usual custom of the Philadelphia Chapter, the final meeting of the season was strictly a social affair to which all members, their wives, and friends were invited. The dinner-dance was held on June 9th at the Philadelphia Quartermaster Depot officers' club and the two hundred persons present were evidence of the well-known success of this annual event.

The usual "meeting" portion of the evening was dispensed with after a word of thanks and appreciation to the outgoing officers and committeemen and introduction of the newly elected officers by Chapter President Harry Ehle.

The new officers are as follows: president—H. A. Ehle, International Resistance Co., who was re-elected for a second term; 1st vice-president—Capt. H. A. Ingram, USN; 2nd vice-president—Col. W. Dillinger, SigC Procurement Agency; 3rd vice-president—Lt. Col. D. L. Rundquist, USAF; secretary—R. G. Swift, Bell Telephone Co. of Pa.; treasurer—J. R. Curley, RCA.

The chapter is already making plans to carry out its role as host to the association for the 1952 convention. A convention committee meeting was held on June 29th to set up the organizational structure of a convention which promises to be one of AFCA's best.



What every industrial executive should know about

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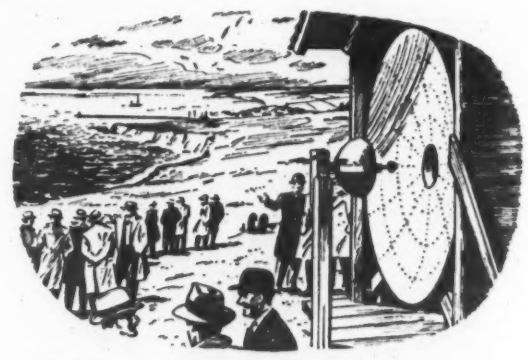
In 1931, International Telephone and Telegraph Corporation became the world pioneer—the *first* to beam man's voice through space by microwave. Today microwave has become the fastest growing communications system for spanning mountains, swamps, rivers and other natural barriers without costly wire lines—a system that is virtually immune to storm damage. And today IT&T is still the recognized leader, with its greatly advanced "pulse time multiplex" method of microwave transmission. If your company is planning to set up, expand or replace its own cross-country communication system, look first to PTM microwave. This versatile, flexible, new method provides for multiple speech channels, unattended telegraph, telemetering, remote control and other signaling. PTM microwave is available through *Federal Telephone and Radio Corporation*, an IT&T manufacturing associate.



IT&T engineers successfully demonstrate first voice transmission by microwave, Calais to Dover, March 31, 1931.

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For information on microwave communication systems, address: *Federal Telephone and Radio Corporation*, 100 Kingsland Road, Clifton, N. J.

CHAPTER NEWS

Pittsburgh

More than one hundred members and guests took part in an interesting and entertaining visit to television station WDTV, a part of the DuMont network.

After watching a television show put on by the Tech Brewing Company, the group was conducted on a behind-the-scenes tour of the studio equipment rooms. At the conclusion of the tour, refreshments were provided by the chapter's host.

Major General Kirke B. Lawton, deputy chief signal officer, was the keynote speaker at the chapter's annual banquet on June 12th. Presenting a vivid picture of the critical world situation, General Lawton brought home to the audience the point that the events in Korea might easily take place in this country and that America may have to fight to pay for its freedom.

The part the Bell System is playing in the present emergency was discussed in a brief address by Mr. J. C. Longstreth, vice president and general manager of the Bell Telephone Company of Pennsylvania. In introducing Mr. Longstreth, Chapter President Fred Moran remarked that he was the one man who has contributed most to the outstanding growth of the Pittsburgh Chapter.

AFCA Executive Secretary George P. Dixon reported on the national affairs of the association and outlined plans for its activities in the year ahead.

The annual chapter elections brought in the following new slate of officers: president—S. C. Stoeher, Jr., Bell Telephone Co.; vice-presidents — R. W. Will, Hamburg Bros.; A. N. Galone, Bell Telephone Co.; Major A. L. Hall, Asst. PMS&T, Carnegie Tech; treasurer—C. A. McKenney, Peoples First National Bank; secretary—R. J. Campbell, Bell Telephone Co.; directors—F. E. Leib, Copperweld Steel Co., and E. J. Staubitz, Blaw Knox Co., both former presidents of the chapter; outgoing president Moran will serve on the executive committee.

A turnout of one hundred seventy members and guests, a record attendance for the chapter, marked the meeting at the William Penn Hotel. Among the distinguished guests present were: General Brehon Somervell, former commanding general, Army Service Forces, and now president and director of Koppers Co.; Rear Admiral Joseph R. Redman, former chief of Naval communications and now vice-president of Western Union; William J. McIlvane, executive vice-president, Copperweld Steel Co.; E. J. Priddey, public relations manager, Gimbel Bros.; Col. G. V. Sottong, commanding officer, Western Pennsylvania Military District; Cmdr. James F. Kennedy, USN; Capt. Robert C. Hall, USAF.

Major General Kirke B. Lawton, center, deputy chief signal office, was the featured speaker at the fourth annual meeting of the AFCA Pittsburgh Chapter in June. To the left is John C. Lonstreth, vice pres. and general mgr., western area, Bell Telephone Co. of Pennsylvania; to the right, Fred E. Moran, superintendent, Western Union Telegraph Co., former president of the Pittsburgh and of the Baltimore chapters.

Rochester

The Rochester Chapter's May luncheon meeting at the Rochester Chamber of Commerce featured Major General Kirke B. Lawton, deputy chief signal officer, as the principal speaker. The meeting was presided over by the chapter's president, Joseph C. Wilson, president of The Haloid Company, and recently designated national director of chapters for the AFCA.

In his address to the chapter members and guests, Gen. Lawton expressed confidence that whatever the outcome in Korea "defense preparations will not end soon," since, he pointed out, "communism will be constantly seeking for soft spots with the ultimate aim of overwhelming us and enslaving our minds and souls."

Gen. Lawton praised the Rochester photographic industry for its contributions of improved equipment for the armed forces, emphasizing that research since World War II had resulted in vast progress. He added that seeming slowness in starting mass production of some items was due to tests to make sure that products would fully meet service requirements.

The deputy chief signal officer compared the current world situation with the 30 Years War of history, with constant threat of trouble between periods of combat. "To meet this threat," he declared, "means continued preparation both for the United States and her allies. It will be costly and mean a lower standard of living for all of us, perhaps patches on our pants, but it need not mean less enjoyment of life."

Some such struggle as Korea was inevitable, said Gen. Lawton, "if we were to avoid such historical mistakes as allowing the Japanese to seize Manchuria, Mussolini to crush Ethiopia, or buying 'peace in our time' from Hitler."

Warning that liberty cannot be bought cheaply, he quoted George Washington's statement that the struggle for freedom must be continued with unremitting vigor day in and day out.

San Francisco

A history of the development of the Western Union switching systems and a tour of the Western Union Reperforator Center in Oakland featured the San Francisco Chapter's meeting on May 31st.

Mr. C. L. Gildroy, assistant general manager of Western Union, told his audience that prior to Western Union's modernization program the telegraph industry was built up around 100 manual relay centers, each of which served its natural geographical tributary area. Thus, a telegram in some cases might transit as many as five relay points, requiring as many as five handlings per center, before it reached its destination.

To provide the best possible service at the lowest possible rates consistent with the interest of the public and the company, Western Union developed a new method of relay known as the "Western Union reperforator switching system." Tied to this revolutionary method was the development of carrier channel transmission facilities.

This program, said Mr. Gildroy, was started in 1934 at Fort Worth, Texas, and completed in 1950 with the installation at Portland, Oregon. Before embarking on such an extensive program, the message distribution system of the entire country was scientifically plotted to provide the most direct route to any given city. The net result was a reduction from 100 manual message relay centers to 15 interconnected reperforating message centers and, further, a reduction from five handling steps at the manual relay offices to one automatic handling in a reperforator switching center. It can thus be seen what a vast improvement was made in the speedy handling of a telegram through the medium of

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In World War II we at Crosley were among the first to place our full resources at the disposal of the military. Our work in developing the proximity fuse and manufacturing many of its most intricate designs won high praise from the armed forces, as did our work on the Mark XIV gun sight.

Again, in the present emergency, Crosley is ready to undertake tough electronic assignments in the defense effort. As the largest manufacturing division of AVCO Manufacturing Corporation, we offer you our enormously expanded resources in man power and productive capacity:

- Five modern, well-dispersed plants, all fully equipped with the most up-to-date automatic machinery and materials handling systems.
- 12,500 trained factory workers, including 3,500 skilled personnel engaged in the manufacture of television and radio.
- 3,300,000 square feet of floor space, of which 700,000 is currently devoted to the production of television, radio, and other precision electronic equipment.
- One of America's foremost staffs of electronic scientists, designers, engineers, and production experts.

A call from you will get our immediate and undivided attention to any electronic problem or project on which we can be helpful, in any way.

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reperforator switching which permits direct automatic transmission from origin to destination.

The speaker pointed out that Western Union is celebrating its centennial this year and is justly proud of the part it has played in shaping the destiny of the nation. Starting its second century of service, the company has just recently announced the development of High Speed Fax, said to be the fastest overall communication method in the world.

Chapter members and guests met for dinner at the Chimes Coffee Shop in Oakland. President Harry Austin displayed the certificate which had been awarded the chapter for fourth place in the 1951 Chapter of the Year contest. Special guest of the chapter was Capt. D. E. McKay, chief of operations division, and director, Coast Guard Reserve, 12th District, San Francisco, formerly chief of Coast Guard communications, and a former director of the AFCA Washington (D. C.) Chapter.

Following Mr. Gildroy's talk, the group proceeded to the Western Union reperforator center where conducted tours were made through the installation. Most members were surprised at the size of the center and much interest was displayed in the equipment used.

Seattle

The type of programs to be featured at future meetings came in for serious discussion at Seattle's May 9th gathering. A poll of the members present indicated they attend for (1) fellowship, (2) technical information, and (3) entertainment and broadening of contacts in allied fields. The following types of programs were suggested: films of technical or general interest; speakers on technical or general subjects; a social meeting once or twice a year to which the wives would be invited. It was also suggested that chapter members be appointed to give short reports on specific subjects of interest at each meeting, such as priorities, controls, new technical developments, etc. The University of Washington speakers bureau was mentioned as a source of feature speakers.

Chapter President Marshall James appointed a program committee and stated that chapter officers and committee chairmen would meet before the next regular meeting to formulate program plans in line with the suggestions made by the members. The program committee is: Lee David, chairman; Capt. S. C. Hansen; Capt. Hunter L. Sharp, and John F. Rozanski.

It was decided that due to vacations and other summer activities the regular monthly meetings of June and August would be cancelled.

A film on the World War II campaign in Europe was shown at the conclusion of the business session.

Washington

Col. Percy G. Black, assistant vice president of the Automatic Electric Company, who as program chairman was responsible for the outstanding meetings staged by the Washington Chapter this past year, has been elected president of the chapter for 1951/52.

The other newly elected officers are: vice-presidents — Capt. W. H. Beltz, assistant chief of Bureau of Ships for electronics; Brig. Gen. E. V. Elder, chief of procurement and distribution division, Signal Corps; Brig. Gen. I. L. Farman, deputy director of communications, Air Force; F. P. Guthrie, asst. vice president, RCA Communications, Inc.; secretary-treasurer—W. P. Dutton, RCA Victor; general counsel—Lt. Col. J. E. Pernice, chief of legal division, Signal Corps.

The Board of Directors consists of: —Maj. Gen. George I. Back, chief signal officer; Col. C. S. Stodter, chief of Army pictorial service div., Signal Corps; Maj. Gen. F. L. Ankenbrandt, director of communications, Air Force; Col. D. B. White, deputy commandant, Air and Airways Communications Service, MATS; Capt. R. R. Hay, naval reserve liaison officer for the Division of Naval Communications electronics division; Capt. A. S. Born, director of electronics division, Bureau of Aeronautics; Capt. Earl K. Rhodes, chief of communications division, Coast Guard; Francis Colt DeWolf, chief of telecommunications policy staff, State Department; Capt. Charles F. Horne, Civil Aeronautics administrator; J. R. B. Crigler, vice president and general manager, Chesapeake & Potomac Telephone Co.; W. J. McManus, vice president, public relations, Chesapeake & Potomac Telephone Co.; George T. Harris, general supt., Western Union; Francis H. Engel, retiring chapter president, Washington manager, RCA Victor Division; E. J. Girard, Washington representative, Federal Telephone and Radio Corp; Glen McDaniel, president, Radio Television Manufacturers Association; A. L. Milk, director of government relations, Sylvania Electronic Products Co.; T. E. Berrier, assistant vice president, American Telephone and Telegraph Co.; Preston Shivers, Washington manager of tech. rep., division of Philco Corporation; L. M. Hill, director, communications equipment division, National Production Authority; Col. William M. Talbot, director warning and communications division, operational services office, Civil Defense Administration.

Rochester Chapter June meeting featured address by Maj. Gen. Kirke B. Lawton, deputy chief signal officer. Shown at speaker's table, L to R: Edward Springer, president, Wollensak Optical Co.; Cmdr. Glenn E. Mishler, USN; Capt. Gordon A. Uehling, USN; Gen. Lawton; Joseph C. Wilson, president of The Haloid Company, and of the Rochester Chapter; Col. Harry H. Haas, USA; Gaylord C. Whitaker, president, Graflex Corp.; Major Richard Ames, USAF; and Rufus Rosenbloom, president Ilex Optical Co.

Student Chapters

Purdue University

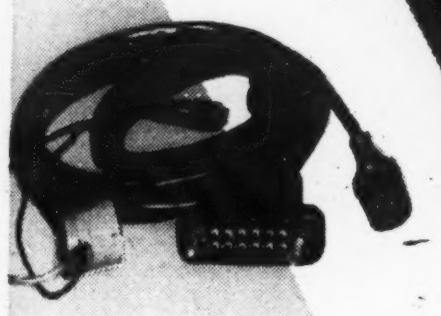
Although only organized during the second semester this year, the Purdue University Chapter in the first four months of its existence has made a record of activities which should be the envy of other AFCA student chapters.

Membership increased from ten to thirty members. A number of interesting meetings were held, with technical and combat films shown at each meeting. The chapter spent one afternoon setting up and operating a radio communication net in the field, using radio equipment from the ROTC department. The highlight of its activities was an inspection trip to the Kellogg Switchboard & Supply Company plant. Two delegates, President Norman Saunders and Secretary Harold Butler, were sent to the national AFCA convention in Chicago where the chapter charter was officially presented.

The chapter also sponsors an amateur radio club, composed of licensed amateur radio operators, which holds code and theory classes for students interested in obtaining amateur licenses. In order to increase interest in the AFCA among sophomore Signal Corps ROTC students, the main source of new members, the chapter is presenting an award to one sophomore Signal Corps student to be selected by the chapter advisors, Col. Norbert Miller and Capt. John Schatz, and the executive committe of the chapter.

At the final meeting of the school year, new chapter officers were elected for next fall as follows: president—Charles Terrell; vice-president—Merrill Simon; secretary-treasurer—Harold Butler, who was reelected for a second term.

NEW Sperry Signal Source



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A new *Microline* instrument, Model 555 Klystron Signal Source, is an extremely well-regulated power supply. It features a continuously adjustable beam supply from 250 to 3600 volts. In addition, a reflector power supply is continuously variable from 0 to 1000 volts, and a control electrode supply is continuously variable from 0 to 300 volts. The versatility of this signal source permits operation of low voltage as well as high voltage klystrons.

Several types of modulation are provided with this instrument: sine wave at 60 cps, 0-300 volts peak to peak; saw tooth wave continuously variable from 600 to 1050 cps, 0-300 volts peak to peak with 15 microseconds decay time; and square wave continuously variable from 600 to 1050 cps, 0-300 volts peak to peak with 5 microseconds maximum rise and fall time. A modulation selector switch on the front panel permits external choice of type of modulation.

Write our Special Electronics Department for further information on Model 555 as well as other *Microline* instruments.

USABLE KLYSTRONS WITH MODEL 555 SIGNAL SOURCE

2K22	3K23	QK-277
2K25	3K27	QK-289
2K26	707B	QK-290
2K28	723A/B	QK-291
2K29	726A,B,C	QK-292
2K33	QK-140	QK-293
2K39	QK-141	QK-294
2K41	QK-142	QK-295
2K42	QK-143	QK-306
2K43	QK-159	6 BL6
2K44	QK-226	6 BM6
2K48	QK-227	SRX-16
2K56	QK-246	X-12
2K57	QK-269	X-13
		X-21

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NEWS—SERVICES and INDUSTRY

communications - electronics - photography

AT&T Under Craig Makes Shifts In Upper Posts

Dumas Becomes Executive V.P.

The American Telephone & Telegraph Co., under its new president, Cleo F. Craig, was regarded as having organized a most competent and excellent management "team" with the acceptance by Hal S. Dumas, president of the Southern Bell Telephone & Telegraph Co. for the past 8½ years, of the post of executive vice president and membership on the board of directors; the election of a new vice president, Charles E. Wampler; and the assignment of new responsibilities to vice presidents William C. Bolenius and Clifton W. Phalen.

Announcement of the election by the AT&T board of Mr. Dumas and Mr. Wampler was made July 18. The four new assignments became effective immediately.

Following the death of President Leroy A. Wilson, June 28, Mr. Craig was elected the eighth AT&T president, July 2, at a meeting of the board of directors. A vice president of the company since June 1940, Mr. Craig headed the long lines department immediately before World War II when the national mobilization program was piling huge service demands on the Bell system. He directed personnel relations from 1941 to 1948, during the critical war and postwar years when employee relations was, as now, of utmost importance; was

(*Continued on page* 62)

New Air Force Generals

Communications-Electronics Officers

Pointing up the increasing recognition of the importance of communications and electronics in military aviation, five top-level Air Force communications-electronics officers were nominated, June 26, for promotion, and were soon afterwards confirmed by the Senate. The promotions were on the basis of temporary grades.

Maj. Gen. Raymond C. Maude
heads the list of the five communications-electronics officers. Since graduating from the U. S. Military Academy in 1926 he has had a long and colorful career in military communications. He was commissioned in the Signal Corps and served with that branch until transferring to the Air Force in April 1947. He is presently commanding general of the 1009th Special Weapons Squadron, Bolling Air Force Base, Washington, D. C., a position he has held since January of this year. He was in 1944 director of communications for the 29th Tactical Air Command in Western France; in 1946 communications officer for the USAF in Europe; in 1947 chief of staff for the Airways and Air Communications Service; in 1949 communications officer for the Continental Air Command, and later that year assistant director of requirements in the office of the deputy chief of staff for operations at U.S. Air Headquarters;and in June 1950 assistant for development programming.

Brig. Gen. E. Blair Garland
one of the four colonels upped to general officer rank, is currently serving as deputy commandant of the AACS and is expected to succeed Brig. Gen. Wallace B. Smith, whose retirement is slated for October, as commandant of AACS. A 1927 graduate of the U. S. Military Academy, Gen. Garland served until recently as communications and electronics officer for the 1807th AACS Wing in Wiesbaden, Germany. After graduation from West Point he attended the Sheffield School of Science at Yale, the Signal School company officers' course at Fort Monmouth; and the telephone school at the AT&T's long lines department.

Brig. Gen. Daniel C. Doubleday
because of his promotion to general rank, is expected to head the electronics

(*Continued on page* 66)

Four New Signal Corps B.G.'s

Four Signal Corps colonels were nominated for the temporary rank of brigadier general, July 11, and were shortly thereafter confirmed by the Senate. The four are:

Brigadier General Elton F. Hammond
who replaced Maj .Gen. George I. Back, the present Chief Signal Officer, at Tokyo as the chief signal officer of the Far East Command.

Brigadier General James D. O'Connell
now signal officer for the Second Army.

Brigadier General Arthur Pulsifer
who is now chief of the personnel and training division, OCSigO.

Brigadier General Robert A. Willard
commanding officer of the Signal Corps Training Center at Camp Gordon, Ga.

Gen. Hammond, a U.S. Military Academy 1919 graduate, had a distinguished service record in the European and North African theaters in World War II. In the invasion of North Africa he was signal officer for the Western Task Force and later, at the Casablanca conference, served as signal officer. Subsequently he was signal officer for the Seventh Army, and later for the Third Army, then commanded by the late Gen. Patton. After the war he was chief of the personnel and training division in OCSigO for 18 months, and prior to his assignment in Tokyo he had served for two years as the executive to the assistant chief of Army staff for G-4.

Gen. O'Connell, a 1922 graduate of the U.S. Military Academy, served for four years, during World War II, in the engineering and technical division. OCSigO, because of his valuable experience from 1935-41 with the Signal Corps Engineering Laboratories at Ft. Monmouth, N. J. In 1945 he was assigned as the head of the signal section of the 12th Army Group in the European Theater. In July 1945 he returned to the Signal Corps Labs and left there in July 1947 to become signal officer of the 8th Army in the Far East Command. Two years later he returned to the Signal Corps Labs and left there in July 1947 to become signal officer of the 8th Army in the Far East Command. Two years later he returned to Ft. Monmouth to serve as deputy president of the Signal Corps Board until November 1950 when he succeeded then Colonel Pulsifer as Signal officer for the Second Army.

Gen. Pulsifer, a 1918 graduate of the U.S. Military Academy and a graduate

(*Continued on page* 62)

Photo Liaison Committee Meets

Need or Techniques Publicity is Theme

Though the field of photographic instrumentation has expanded to such proportions that presently two-thirds of all photographic materials produced are being used by the government, business, industry, and science, aggregating a multimillion dollar annual investment in this country, information on the techniques of instrumentation is poorly disseminated and finds almost no outlet in photographic publications. Such was the report of the first meeting of the sub-committee on engineering and technical society liaison, of the Society

THIS DEPARTMENT'S PRINCIPAL SOURCE
Telecommunications Reports

Roland C. Davies, Editor
National Press Building
Washington, D. C.

of Motion Picture and Television Engineers' high speed photography committee, held May 3* in New York City.

The new committee, including in its membership representatives invited from various pertinent organizations, of which the AFCA is one, was set up with the expectation that by bringing together such representatives a permanent liaison group might be formed to correlate and disseminate information on photographic instrumentation. AFCA's representative to the committee is William H. Rivers, a director of the AFCA New York Chapter, and a Fellow of the SMPTE.

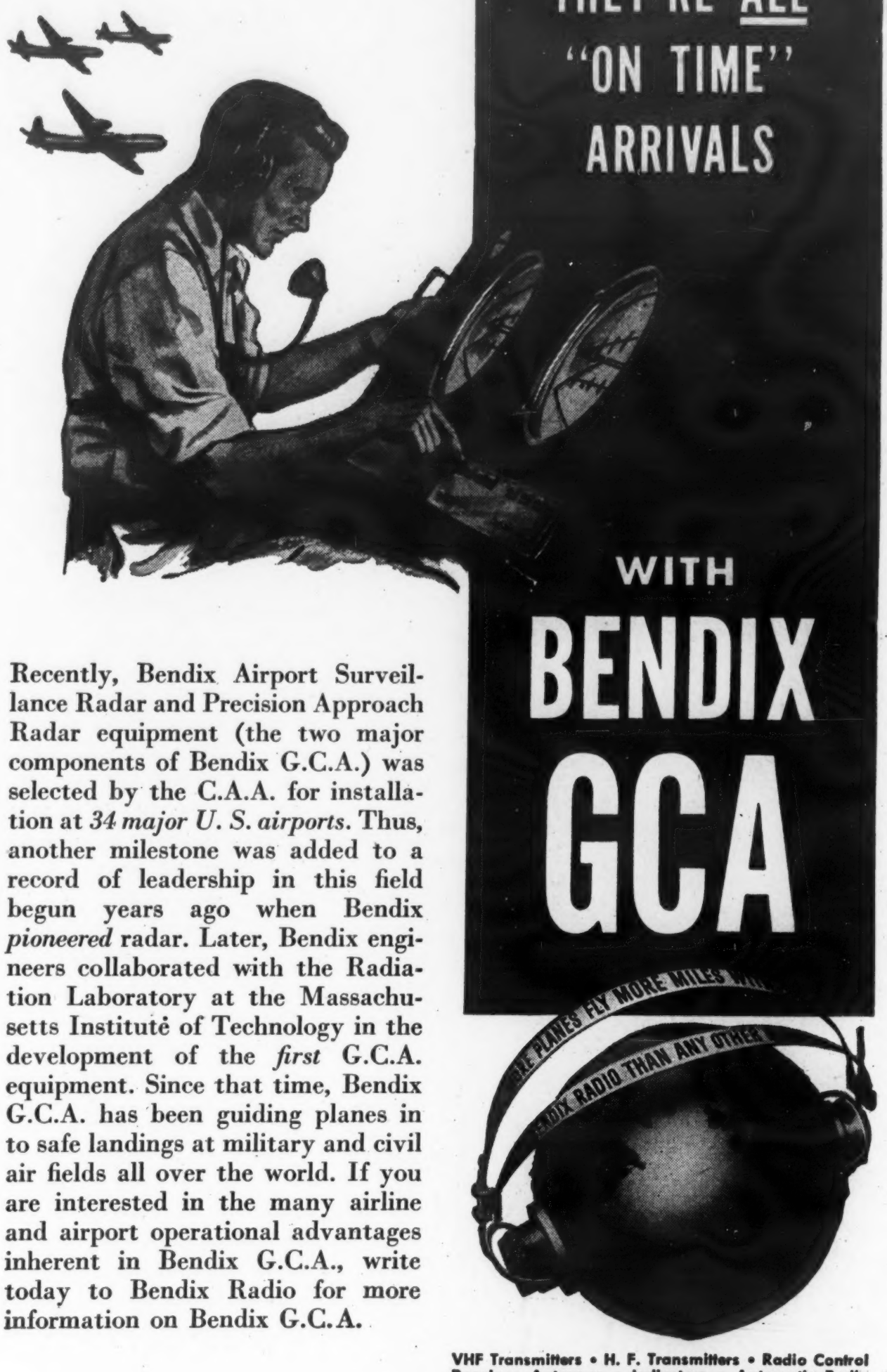
As an introduction to tackling its main problem of publishing information, the liaison committee, with Kenneth Shafton of SMPTE as its chairman, at its initial meeting defined "photographic instrumentation" as the use of a photo-sensitive medium for the detection, recording, and/or measurement of scientific and engineering phenomena. In defining its scope in this committee's particular efforts, it was pointed out that the well monitored fields of photographic instrumentation would not be included, such fields including astronomy, spectroscopy, aerial photography, photogrammetry, and medical and industrial radiography.

On the problem of disseminating information of instrumentation techniques, it was stressed at the meeting that the findings resulting from the use of instrumentation, and the event or subject being photographed, are widely published, appearing in nearly every journal of a scientific or engineering nature, while at the same time these publications almost ignore the instrumentation techniques involved. Their editors are essentially concerned with the results of investigations, and even if they cared to include photographic instrumentation information they are hampered by space limitations and the limitations of general reader interest.

Such information as is published in the field of instrumentation appears in journals other than those of the photographic societies. The interchange of information between these societies, or more particularly between the various fields of endeavor is at present poor, and at best very slow. In addition, there is felt to exist no adequate abstract or digest publication specalizing in this particular field. This was the problem which the committee set about to solve, and toward that end took its first action in a suggestion that a permanent panel of representatives of the interested societies of this country be formed to carry out a series of functions.

The first function will be to continuously examine the matters relating to dissemination of information; and the second, and immediate, program will be the institution of an abstract service to be coordinated by the sub-committee. In keeping with the latter a classified

*The report of the committee meeting was considerably delayed because of a prolonged illness of the stenotypist who took the minutes.



Recently, Bendix Airport Surveillance Radar and Precision Approach Radar equipment (the two major components of Bendix G.C.A.) was selected by the C.A.A. for installation at *34 major U. S. airports*. Thus, another milestone was added to a record of leadership in this field begun years ago when Bendix *pioneered* radar. Later, Bendix engineers collaborated with the Radiation Laboratory at the Massachusetts Institute of Technology in the development of the *first* G.C.A. equipment. Since that time, Bendix G.C.A. has been guiding planes in to safe landings at military and civil air fields all over the world. If you are interested in the many airline and airport operational advantages inherent in Bendix G.C.A., write today to Bendix Radio for more information on Bendix G.C.A.

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listing of papers of interest appearing in the journals of the various societies will be furnished to the subcommittee for compilation and publication in the Journal of the SMPTE. This compilation will also be furnished to all member societies for publication in their journals if they so desire. It was pointed out that the photographic journals, with the Journal of the SMPTE leading the way, would make space available for the publication of instrumentation data which cannot now find outlet in the journals of the other technical societies.

Horne Asks CAA Funds Restored

Civil Aeronautics Administrator Charles F. Horne was understood to have presented strong arguments to a Senate appropriations committee July 12 for restoration of the $17,150,000 cut by the House appropriations committee in the funds for the establishment, maintenance, and operations of electronic and radio air navigation facilities of the Federal Airways. Captain Horne was said to have emphasized to the Senate body that air safety is essential in the current period of national defense mobilization, with more than a 20% increase in flying over the Federal Airways and that, while the CAA had rigidly obeyed Congress in effecting the previously recommended economies in its airways operations, the House committee's action meant the retarding of the CAA's entire program of installing the latest electronic-radio-radar devices.

It is known that Captain Horne has been cooperating very closely with the military services on the expansion of the air-navigation facilities along the time-table of the Radio Technical Commission for Aeronautics' Special Committee 31's project of all-weather flying.

TV Wins Channels Over Mobiles

Facing a choice of permitting development of 100 mobile radiotelephone channels or of adding five more ultra high frequency television channels to the existing 65, the FCC, in a decision adopted July 11, chose television.

In its fourth report and order in the television frequency allocation proceeding, of which the issues growing from the Bell Telephone Laboratories' request for frequency space in the 400-500 megacycle area for the development of a multi-channel broadband common carrier radiotelephone system were made a part, the FCC rejected the Bell Laboratories' petition. The FCC specifically allocated the available 470-500 mc area for five UHF television channels.

The five-man FCC majority, with vice chairman Paul A. Walker dissenting, offered the nation's telephone companies and miscellaneous common carriers three alternatives: (1) smaller separation between frequency assignments in the bands below 162 mc—"40 kc, or even 20 kc frequency separation"; (2) development of "more efficient techniques of operation, such as a single sideband transmission, multiplex, etc"; or (3) "utilization of geographic frequency sharing so as to obtain utilization of frequencies assigned to non-common carrier services in critical population centers where such non-common carrier frequencies are not required for local use."

WEBSTER·CHICAGO

Communication Equipment

Two-channel Playback Unit for a 24 channel airborne phase modulated magnetic data recorder or a 50 channel phase modulated magnetic data recorder-amplifier.

Six-channel magnetic data recorder

To the left are a few of the wide array of products currently being produced by Webster-Chicago. Some are exclusively for the Armed Forces; others are available for consumer use also. They demonstrate the production facilities of Webster-Chicago to manufacture one-of-a-kind equipment and volume production items.

Both Webster-Chicago plants have been cleared for "Classified" work. Many employees have been approved for "Top Secret" work.

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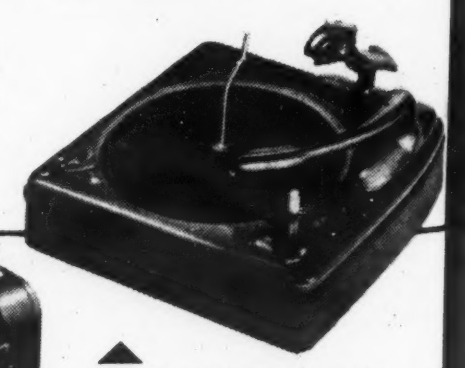
CHICAGO 39, ILLINOIS

Web•Cor magnetic Tape Recorder. Records and plays back immediately

Webster-Chicago Electronic Memory "228" Dictation Machine. A compact wire recorder with special accessories for easy dictating and transcribing.



Webster-Chicago Disk-changer. Plays all three size records at all three speeds. Plugs into and plays through speaker of a radio or television set.

Unit Lays 25,000 Miles of Wire

More than 25,000 miles of commun cations wire was dropped by wire co struction teams of the 13th Signal Co pany, 1st Cavalry Division, during t nine months ending last May. T unit set its highest record during t first two and one-half months of Kore combat operations by stringing so 5000 miles of spooled wire over treac erous mountainsides, swift rivers, a miles of Korean roads.

Wuerker Cited For Traffic Work

Commander Alexander W. Wuerker, USCG, was recently commended by the Coast Guard for "outstanding work" as chairman of the operation policy group of the air coordinating committee's air traffic control and navigation panel. Comdr. Wuerker's report will be used as a guide for the common civil-military air traffic control and navigation system within the country.

Dulin Heads NPA Radio Equipment

W. E. Dulin, chief of the FCC's marine division's technical branch until July 1950, and since then acting assistant chief of the division, became July 23 chief of the radio communications equipment section of the electronics division of the National Production Authority.

In his new position Mr. Dulin will handle NPA activities concerning radio apparatus for fixed, portable, mobile, airborne, and shipborne use, as well as radio navigation aids, civilian radar, sonar, microwave radio and other radiocommunications and navigational equipment.

During five years service with the FCC, Mr. Dulin had served as adviser on the provisional frequency board in Geneva in 1949, and as chief witness for the commission at a hearing on radar operators. During World War II he was chief of the Navy Bureau of Ships' electronics division's radio maintenance section, and also served on BuShips' radar and publications section as editor of the communications equipment maintenance bulletin. Before the war Mr. Dulin was employed at the Naval Research Laboratory in communications security work, spent a year with the Signal Corps radar division and another year with the Maryland Forestry Dept. where he was in charge of radio communications. He also graduated from the Signal Corps Laboratories radar school at Fort Monmouth, N. J.

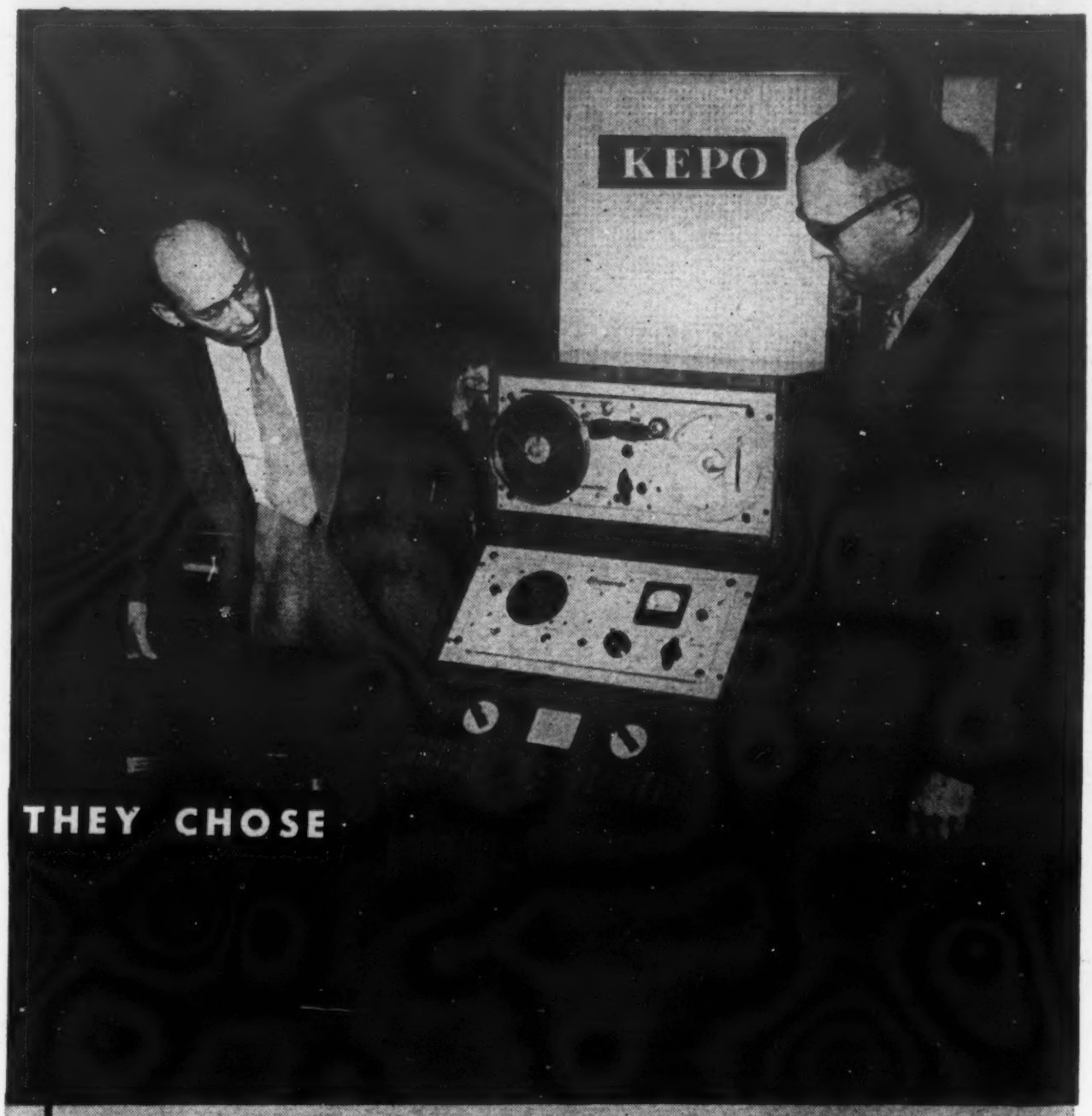
Procurement Info Offices Moved

For the convenience of businessmen visiting Washington, the Army Procurement Information Center and the Central Military Procurement Information Office of the Munitions Board, Department of Defense, have moved to 34 Old Post Office Building, 12th and Pennsylvania Avenue, NW, in down town Washington. Neither of these offices do any purchasing. Contracts are awarded through field procurement offices, each of which has complete information facilities.

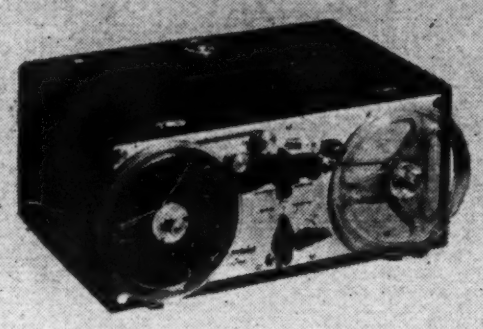
Special Course For Reserves

A non-resident Command and General Staff College course for Reserve and National Guard officers has been

(*Continued on page 64, col. 1*)



THE FIRST CHOICE OF RADIO ENGINEERS

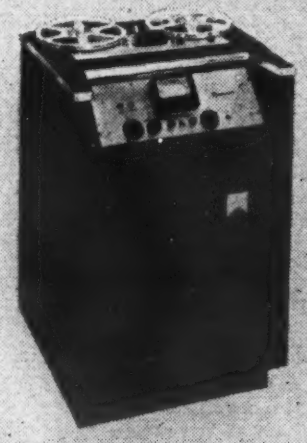


FLEXIBILITY

In rack or console, or in its really *portable* cases, the Magnecorder will suit every purpose. PT6 Series shown is the most widely used professional tape recorder in the world, and is available with 3 speeds (3¾", 7½", 15") if preferred.

FIDELITY

Lifelike tone quality, low distortion meet N.A.B. standards — and at a moderate price! PT63 Series shown in rack mount also offers three heads to erase, record, and play back to monitor from the tape while recording.



FEATURES

PT7 accommodates 10½" reels and offers 3 heads, positive timing and pushbutton control. PT7 Series shown in complete console model is also available for portable or rack mount. For outstanding recording equipment, see the complete Magnecord line — PT6, PT63 and PT7.

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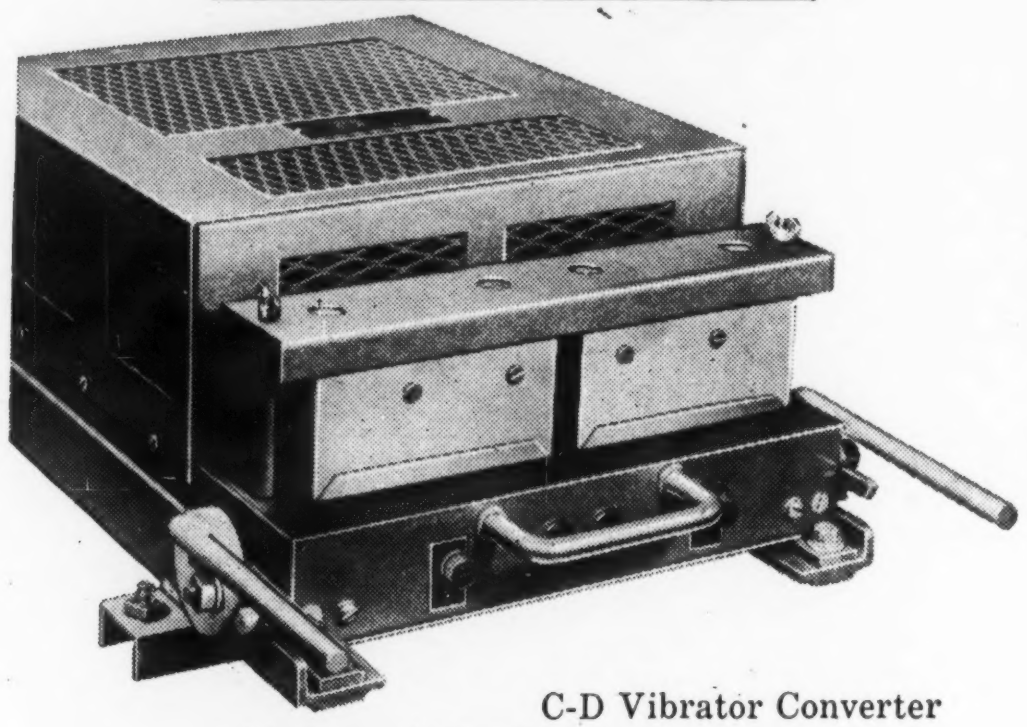
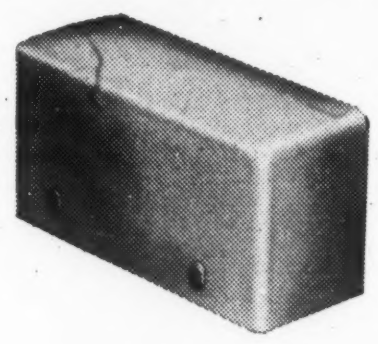
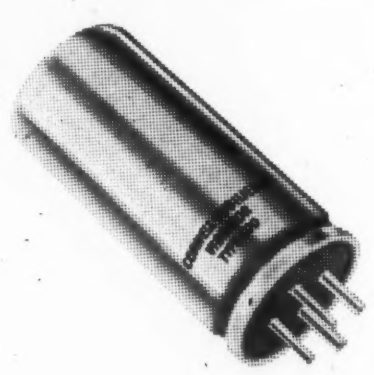


C-D Vibrator Converter with the exclusive double vibrator automatic self-service feature. Developed by C-D engineers for the major railroads; can be applied wherever continuous duty is a "must."



Hermetically-sealed, heavy-duty C-D Vibrator—for AC heaters, wing de-icers, engine pre-heaters, etc.



24-volt, 115 cycle synchronous C-D Vibrator, built to military specifications.

If you don't have C-D's latest Vibrator & Converter Catalog, write today for your personal copy. Cornell-Dubilier Electric Corp., Dept. F71, Indianapolis 8, Indiana.

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Plants in South Plainfield, N. J.; New Bedford, Worcester, and Cambridge, Mass.; Providence, R. I.; Indianapolis, Ind.; Fuquay Springs, N. C.; and subsidiary, The Radiart Corp., Cleveland, Ohio

Air Force Promotions

(*Continued from page 56, col. 2*)

test and research center at the Rome, N. Y., Air Development Center. He is presently serving as director of research and development at the Air Force special weapons project at Sandia Base, N.M. From June 1940 to December 1944 Gen. Doubleday served at Wright-Patterson AFB and in Washington in connection with the installation and equipping of aircraft with radio and radar equipment. In 1944 he was named deputy air communications officer at the Far East Air Force Headquarters in the Pacific.

Brig. Gen. Gordon A. Blake

now chief of the weapons components division of the air research and development command at Wright-Patterson AFB, is the most decorated of the five communications-electronics officers promoted. Serving as communications officer of the 18th Wing in Hawaii before the Japanese attack on Pearl Harbor, Gen. Blake held that post until June 1944 when he was assigned as area communications control officer of the Pacific Airways Communications Area. He was in combat from 1944 until the end of the war, and later served as commanding officer of the 7th Wing in Hawaii.

Brig. Gen. Thomas L. Bryan

is slated to become commanding general of the 10th Air Division in the Alaska Air Command. He has been deputy chief of staff for communications and electronics, and prior to that post was chief of the operations section, electronics sub-division of the Air Materiel Command. During World War II he was active in the training of communications personnel in the States, and from January 1944 to October 1945 was communications officer for the 5th Air Force in the Southwest Pacific Area.

AIR-TO-GROUND RADIO TRAINING STATION

To facilitate radio operator training on C-97A Stratofreighters a complete air-to-ground radio station has been established by the communications section of the 1274th Air Transport Squadron's heavy training unit at Kelly Air Force Base, Texas.

The only training unit of its kind on Stratofreighters, the 1274th HTTU of Continental Division found it necessary to give more than mere academic training to future radio operators flying on the MATS sky giants. Attesting to the thoroughness of training received at the C-97 school, the communications section, teaming up with its supervisors, built from the ground up a complete transmitting and receiving station to maintain live contact with student operators in flight aboard the school's Stratofreighters.

Equipment within the ground station consists of two ART-13 transmitters and two BC-348 receiver units with a Jefferson-Travis 350 unit held in reserve in the event of failure of any other equipment. Antenna equipment, built by the radio-operator instructor personnel of the 1274th, includes vertical type and also whip type to be used in emergencies. Operating on a 50-watt output the ground station is manned by both instructor and student personnel, who maintain contact with students and instructors flying during their flight training periods.

Considered as the only unit of its kind in exclusive use by one organization, the high frequency transmitter and receiving unit has been given the call of AFF-3 and authorized to operate on two frequencies by Air Force headquarters.

Benefits to student personnel attending the communications course on the C-97A's have shown a marked favorable upward trend since the advent of the ground station. No longer given only rudimentary fundamentals of the aircraft's radio system, the graduating student now has full knowledge of his expected working conditions, and can be assigned to his Stratofreighter unit fully confident that he can handle his vital role as a crew-member of the C-97A.

Dramatic Proof from KOREA!

ACTUAL EXCERPTS OF UNSOLICITED LETTERS FROM SOLDIERS IN KOREA

AMIDONG, KOREA—22 March, 1951:

"... S-72 performed better than expected. We can hear the news each day instead of waiting for the news papers. The radio will pick up Japan easily on standard broadcast or short wave; and on the latter you can get Australia (even in the daytime) Manila, Honolulu, and San Francisco."

KOREA—38th Parallel—3 April, 1951:

"... my S-72 is performing very well. I receive standard broadcast very good at night. I have been able to pick up London and San Francisco direct on short wave."

c/o Fleet Post Office,
San Francisco, California, 14 April, 1951:

"... in central Korea, S-72 operates well regardless of location"

hallicrafters S-72

LONG RANGE PORTABLE

The World's Most Powerful Portable

Servicemen the world over are recording a new chapter in performance for Hallicrafters famous S-72. This 8-tube masterpiece of precision engineering features the widest frequency range of any portable made—with *continuous coverage* from 540 kc to 30 Mc.*

PRICE: $109.95 Less batteries. AC/DC or batteries; brown leatherette cabinet. 61-in. whip antenna for short wave; loop for long wave.

*S-72L, for aircraft and marine band reception, $119.95. 175-920 kc plus 540-12.5 Mc.

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WORLD'S LEADING MANUFACTURER OF *PRECISION* RADIO & TELEVISION • CHICAGO 24, ILL.

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	U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B	"PERMADINE"
	U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02, Class A	"THERMOIL-GRANODINE"
ALUMINUM	MIL-C-5541 MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16E4 (Ships)	"ALODINE"
ZINC	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6	"LITHOFORM"

"GRANODINE"®

"GRANODINE" forms a zinc phosphate coating on steel and zinc surfaces. This non-metallic bond holds and protects the paint finish and thus preserves the metal underneath.

"PERMADINE"®

"PERMADINE" forms an oil-adsorptive zinc phosphate coating on steel, which, when treated with rust inhibiting oil, is highly corrosion resistant.

"THERMOIL-GRANODINE"®

"THERMOIL-GRANODINE" forms a manganese-iron phosphate coating on steel, which, when oiled, provides wear-resistance for rubbing parts — and, when oiled or painted, inhibits corrosion.

"ALODINE"®

"ALODINE", the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal painted or unpainted.

"LITHOFORM"®

"LITHOFORM" makes paint stick to galvanized iron and other zinc and cadmium surfaces.

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AMERICAN CHEMICAL PAINT COMPANY

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Manufacturers of METALLURGICAL, AGRICULTURAL and PHARMACEUTICAL CHEMICALS

Signal Corps Promotions

(*Continued from page* 56, *col.* 3)

of the Signal Corps School saw considerable Pacific service, having been with the Hawaiian Department, prewar, from 1931 to 1937, and during World War II signal officer of the 10th Army in the Pacific. He was also for a time, signal officer of the Third Army in the European Theater. After the war he returned to Hawaii to serve as executive officer with the Oahu Signal Service. Appointed signal officer of the Second Army, Ft. Meade, Maryland, he served in that assignment until November 1950 when he became chief of the personnel and training division, OCSigO, the position he still fills.

Gen. Willard, a U. S. Military Academy graduate of 1917, and a graduate of the Signal School, has been an instructor for much of his military career. From 1922 to 1925 he was an instructor at West Point; from 1926 to 1927 director, department of training, Signal Corps School; 1929 to 1934, instructor at the Signal Corps School; and from 1934 to 1939 he was signal officer at West Point. Appointed executive officer of the Signal Corps replacement training center at Camp Crowder, Mo., in 1940, he became commanding officer of that post in 1943. He later served as signal officer of the 1st Airborne Army in Europe, in 1946 as signal officer of the Headquarters, Berlin Command, and in 1947 was appointed commanding officer of that command. He remained in Berlin until July 1949 when he became commanding officer of the Camp Gordon training center, his present command.

AT&T Top Level Changes

(*Continued from page* 56, *col.* 2)

in charge of the operation and engineering department for nearly a year and a half, starting in July 1948, at a time when expansion and improvement of plant to meet continuing unprecedented service demands was at peak levels; and has headed AT&T financing activities since November 1949, in charge of raising the huge amounts of new capital which has been required to fulfill the Bell System's obligations to provide essential communications services.

Mr. Dumas, in his new duties as executive vice president, will assist President Craig in the general overall operation of the Bell System. Mr. Dumas brings to his new post a wealth of diversified telephone communications experience and an outstanding record as an administrator gained in 40 years of telephone service. During his presidency of the Southern Bell for the past 8½ years, he directed the extensive service activities and huge expansion of that company during World War II and the postwar periods. It was during these years that the Southern Bell achieved its greatest growth, doubling in size and extending its telephone and communications services throughout the entire nine Southern states, not only to millions of new telephone users in cities and towns, but to far-flung areas of the rural South.

Mr. Wampler, who has been assistant vice president in the operations and engineering department since December 1950, and during recent months served on loan most creditably as deputy defense production administrator in Washington on the national defense mobilization program, became vice president in charge of revenue requirements in the AT&T's realignment.

Mr. Bolenius, who has directed the personnel relations activities of the AT&T since July 1948, when he succeeded Mr. Craig in that capacity and prior to that had served nearly two years as president of the Wisconsin Telephone Co., takes over the responsibilitis of accounts and finance.

Mr. Phalen assumes the responsibilities of the personnel relations department after having been vice president in charge of the information department from August 1948 to November 1950 when he became vice president in charge of revenue requirements.

Connector Problem?

...We'll take it from HERE

Good ideas for electronic circuitry sometimes run afoul of connector problems. Maybe existing connector units won't hold air pressure gradients, won't stand the heat, aren't rugged enough for the job. Or maybe it's a question of altitude, or under-water application. But if you can sketch the circuit, we'll take it from there. We've engineered so many special connectors, solved so many "impossible" problems, that whatever the requirements are, we can usually provide the answer.

Lightweight actuators for any requirement.

Job engineered, welded-diaphragm bellows.

Flexible conduit and ignition assemblies.

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WRITE TODAY for specific information, or send us your sketches. We'll forward recommendations promptly.

Removable pins in Breeze connectors speed soldering, save time, trouble. Pins snap back into block.

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Special CONNECTORS

BREEZE CORPORATIONS, INC.

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Special Reserve Course

(*Continued from page* 50)

announced by the Army. The special associate course, to be administered by commanders of the continental armies, requires three years for completion and parallels the 12-week resident associate courses at Fort Leavenworth, Kan.

Individuals who wish to enroll in the special associate course may apply at any time through their appropriate commanders or instructors to the headquarters of the Army area in which they live.

Defense Films Available

The Defense Department recently announced several general interest films available to management and labor for non-profit public showings. 16 mm sound prints of the following subjects may be booked:

Your Air Force In Action—a general interest film centered around Korean action of the U. S. Air Force.

Crime Of Korea—story of a correspondent's visit to Korea before and after the invasion.

Research And Development—story of the importance of research by the armed forces.

A Fighting Lady Speaks—story of naval aviation including action in Korea.

Self-Preservation In An A-Bomb Attack—deals with possible damage of a A-bomb and some practical suggestions of self-preservation. Good general interest subject which involves industrial areas.

These films may be obtained free of charge by writing to Industrial Services Branch, Office of Public Information, Department of Defense, Washington 25, D. C.

TV's "Golden Spike"

The long-awaited coast-to-coast television network hookup, the AT&T Co. announced recently, is expected to go into operation September 30. The basic link will be by way of AT&T's microwave radio-relay between New York and San Francisco. Los Angeles and San Francisco already are connected by microwave.

The coast-to-coast microwave system will go into operation first for long-distance telephone traffic on August 17. It will virtually double the nation's transcontinental communications facilities.

Armed Forces Industrial College Announces Field Course Schedule

For the academic year 1951-52 The Industrial College of the Armed Forces has announced that it will present its field economic mobilization course in 18 of the major industrial centers of the country. The course, of two weeks duration is a condensed version of the ten-month resident course at the Industrial College in Washington, D. C. It is organized to present the problems which will confront the country in a full mobilization of the national economy for war, to show the resources and economies of potential belligerents, allies and neutrals, and to examine methods and procedures for making the best use of our resources . The approach is entirely educational as the college is not an advisory, planning, or operating agency.

The 1951-52 schedule for the field course is as follows:

Sept. 24—Denver, Colo.
Sept. 24—Syracuse, N. Y.
Oct. 22—Kansas City, Mo.
Oct. 29—San Antonio, Tex.
Nov. 26—Louisville, Ky.
Dec. 3—Des Moines, Ia.
Jan. 7—Indianapolis, Ind.
Jan. 24—Newark, N. J.
Feb. 4—Oakland, Calif.
Feb. 11—Milwaukee, Wis.
Mar. 10—Jacksonville, Fla.
Mar. 17—Springfield, Mass.
April 7—Reading, Pa.
April 14—Portland, Ore.
May 12—Fort Worth, Texas
May 19—San Diego, Calif.
June 9—Lincoln, Nebraska
June 16—Columbus, Ohio

The course is given to Reserve and National Guard officers of all the services and to civilian lealers in the fields of industry, education, labor, and civic life. Reserve officers who desire to attend should apply through military channels to the respective Army area, Naval district, or Air Force commanders in whose command the course is being presented; National Guard officers to the chief, National Guard Bureau. Upon selection, officers are ordered to active duty for the period of instruction. Civilian participants are chosen by locally appointed civilian committees.

A correspondence course, first offered in September 1950, has been developed to satisfy the interests of the many who could not attend the resident course and who desire more complete instruction than that presented by the field economic mobilization course. This course, however, is presently enrolled to its authorized capacity of 2500.

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Westinghouse Electric Corporation
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Instructor's High Value, Low Glamor

The importance of the instructor in the Air Force, with yet none of the pilot-and-crew glamor associated with his job, was recently pointed out by the Air Materiel Command at Wright-Patterson AFB. The instructors, it is supposed, will probably never be the subject of song or story, but it is made clear that without them the Air Force would not be the potent force it is today.

Training in the Air Force has become increasingly important as aircraft become more complex. While jet engines are much simpler in construction than the reciprocating engine, the increasing use of electronics in all aircraft presents problems undreamed of when the Wright brothers designed the first airplane. At that time any automotive mechanic could service an airplane.

The field of electronics, complex in itself, becomes more so as new developments are made. Radar, inter-com systems, and all the many navigational instruments used in the airplane of today require a host of highly-skilled technicians, men who know exactly what they are doing and can do it quickly. All this requires many classroom hours and large groups of students.

It is the job of the instructors, usually key personnel of commands and tactical units, to learn everything possible about a new piece of equipment and then pass on the information to those who actually service, maintain and overhaul the warplanes that are changing almost daily. All their time is spent either in a factory classroom, assimilating knowledge, or in an Air Force classroom disseminating knowledge.

If it weren't for these instructors, th

PREPARE TO CRASH LAND!

AND WHEN THEY DO HOFFMAN EQUIPMENT IS READY TO TAKE IT!

There are no "kid gloves" used on any of the electronic equipment manufactured at Hoffman Radio Corporation for the Armed Forces. Hoffman engineers treat 'em rough —as rough as the actual conditions they will undergo aboard ship or in the air.

Pictured here is one of the many testing machines used at Hoffman to make sure the equipment can take it. This special shock testing machine was developed by the U.S. Air Force. It will simulate conditions ranging from rough handling in shipping and installation to emergency situations in actual use. It is capable of producing shock impact loads of from 2 to 150 "G"s.

Hoffman precision-engineered electronic equipment is used all over the world by the U.S. Air Force, U.S. Navy and various U.S. Government agencies.

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groundcrews would lose valuable time learning the intricacies of a new piece of equipment and the pilots and their crews would be grounded or endangered by haphazard maintenance. Without the instruction program a continuing stream of maintenance personnel would be traveling from all parts of the world to attend factory schools as each new piece of equipment was purchased. This would mean heavy tuition and transportation expenses, and loss of personnel often when needed most in a combat area or a maintenance depot.

With the instruction system classrooms are set up in combat zones, maintenance depots, or experimental installations, and maintenance personnel are trained as they can be spared from their regular duties. Tuition costs are kept low because of the small classes needed to teach only key personnel. The program has saved the Air Force and the taxpayer considerable money because of its method of training a few for many.

ARCS, New MATS Division

The first two of several air resupply and communications wings being organized and trained in the U. S. by the Military Air Transport Service were recently activated at Mountain Home Air Force Base, Mountain Home, Idaho. The wings, which will be deployed later for overseas assignments where they will serve under the operational control of theater commanders, will have two major wartime missions: One, to prepare, reproduce, and disseminate psychological warfare materials as directed by the theater commander; and two, the aerial resupply of military units.

The responsibility for organizing and training the new wings has been assigned to Air Resupply and Communications Service headquarters, 3800 Newark St., NW, Washington 25, D. C. This service was activated 23 February 1951 as a major division of the Military Air Transport Service and operates on the same command level as other major MATS units such as the Airways and Air Communications Service. The first of the new wings was activated at Mountain Home 16 April 1951, the second on 23 July 1951.

AACS' Part In Capital Reviews

The nation's capital, Washington, D. C., sees more parades and processions than any other U. S. city, because while national heroes may tour the country, Washington alone receives and honors foreign dignitaries, and its nearby Arlington Cemetery is where the country's military great go to their last resting place. Included in the parades, reviews, and processions that these events occasion are flights of military aircraft. And their passing is always spectacular. Everyone in their vicinity, free to look skyward, surely raises the head to look. But it is not so sure that anyone sees, and for many it is nearby, the unit on the ground which controls the flight of the aircraft. The Airways and Air Communications Services has supplied an account of a typical operation in control of aircraft during one of Washington's parade days. Their narrator takes it from here:

It was a gala day in the nation's capitol when President Vincent Auriol of France arrived. The first French president ever to visit the United States, the welcome red, white, and blue carpet was rolled out to greet him.

As five thousand men and women of all service branches passed in review, Air Force, Navy, and Marine jet fighters zoomed overhead in a show of precision and speed. All eyes turned skyward to follow the precise formation of the armed forces planes.

Unnoticed by the thousands of sky-interested watchers, a large, yellow, glass-encased truck stood in the small triangle on Pennsylvania Avenue. This truck was the mind of the air show—"fly by"—in military jargon.

Operated by three communications technicians, 1st Lt. John Lang of the 21-st Fighter Squadron, Andrews AFB; M/Sgt. Richard Johnson, chief of the 1909th AACS Service Squadron maintenance section, Andrews AFB; and S/Sgt. Allen Stienbauer, also of the 1909th AACS Squadron, these men followed the aircraft with watchful eyes.

Sgt. Stienbauer, with microphone in one hand and formation plans in the other, controlled the timing and movement of each squadron. Each group radioed its position before coming into view and was given the exact split second to approach and roar over the reviewing stand.

Coordinated with the control center at Washington National Airport, these men constantly kept the pilots informed of wind direction, speed, and air traffic in the Washington area.

As the jets roared into view the men consulted the plans on which plane formations previously had been conceived as they checked precision and timing.

Previous to all preparations for the gigantic parade, Sgt. Johnson had checked the specialized equipment to insure operation of the mobile power. He had selected the location for the truck in relation to the height of the building surrounding the area. He had checked the many dials, buttons and switches to insure operating efficiency. During the entire period of the "fly-by" Johnson kept an almost maternal eye on all essentials and assured the airmen of their vital contact with Lang and Stienbauer.

As the thunder jets and panthers swooshed out of sight on their final "fly-by" the three men on the ground quietly packed their precious equipment and departed as unheralded as they had come.

A Letter

George P. Dixon, Executive Secretary
Armed Forces Communications Association
1624 Eye Street, NW
Washington 6, D. C.

Dear Sir:

I noticed, while reading one of the 1950 editions of Signal, the name of 2nd Lt. John A. Colborn under "Addresses Unknown." I have known Lt. Colborn, now 1st Lt., since the invasion of Inchon last September with the 4th Signal Battalion of which he is still a part. He is now in charge of the photography section although his duties were in radio and message for some months following the invasion.

I understand AFCA recognizes outstanding works in communications by giving an award. I would like to tell you of an outstanding achievement of Lt. Colborn in signal work under the most adverse conditions at the Chosin Reservoir in North Korea during November and December 1950. I, and friends of mine who were there with him also, feel that he warrants the AFCA award.

Lt. Colborn was officer in charge of the advance message center for X Corps with the First Marine Division when we were completely surrounded by Chinese communist forces. Night and day under heavy enemy assault Lt. Colborn kept the message through to our forces in the rear. At times his equipment would break under the twenty-four hour load but was repaired with split second timing.

During one phase of our last battle before withdrawing from Hagaru-ri he took up a machine gun and wiped out an enemy machine gun which threatened to break our line causing us to lose our heavy signal equipment and open assault on the convoy in the valley below heading south. The line held until our final withdrawal. On reaching Koto-ri he sent all of us to Hamhung and safety while he remained with the radio truck until all friendly troops had withdrawn.

He was awarded the Bronze Star with V device for Valor, but we feel that he has earned something more. That is why I brought his story to your attention while informing you of his whereabouts.

Sincerely
Cpl. Mack R. Wells
4th Signal Battalion Corps
APO 310, U.S. Army

Ed. note: As Col. Dixon pointed out to Cpl. Wells, in his letter of answer, the AFCA medal is not an appropriate medal for deeds of heroism. At the present time we award these medals only to ROTC cadets for outstanding work in AFCA's field. We, however, salute the outstanding courage which Lt. Colborn has demonstrated, and are happy to be able to bring his story to the attention of SIGNAL *readers.*

Does your long-distance reception have that "personal" sound of a friendy confidence, spoken close to your ear? Is it clear and distinct? Telephone engineers everywhere find that where long-lines reception is weak, a repeater boosts transmission level and provides a good circuit. Avoids confusion in telephone conversations, saves time and money for the operating company.

The Kellogg Repeater is easy to install, simple to maintain. (You don't need tools or soldering irons for adjustments. Accurately-calibrated controls allow quick, easy changes from the equipment side of the unit when line conditions vary.) It consists of two vacuum tube amplifiers that amplify voice signals in both directions on a two-wire circuit. Improved filter design permits maximum gain, and a quiet telephone circuit. Kellogg Repeaters are assembled and wired on a "unit" basis for greater flexibility. Each unit mounts on a standard 19" relay rack, or in a cabinet.

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Xeroradiography X-Ray Process

Commercial development of xeroradiography—a new process that may greatly reduce the use of films and darkrooms in industrial x-ray work—is the object of a joint program launched by three organizations: The Haloid Company of Rochester, New York, Battelle Memorial Institute, Columbus, Ohio and General Electric X-Ray Corporation, Milwaukee, Wisconsin.

Xeroradiography is expected to make x-ray inspection faster and more economical so that it can be utilized in many more industrial fields for the first time, particularly in smaller foundries, machine shops, general metal-working firms and many other types of plants. It may also provide a tool of considerable value in the inspection of ordnance and other war material.

Xeroradiography (pronounced "Zee-ro-radigraphy") is a fast, low-cost, dry, direct-positive process for producing x-ray images. It is electrostatic, rather than chemical in nature. Re-usable plates and low-cost powders take the place of chemicals and films used in conventional radiography. In less than two minutes, with a minimum of effort, an industrial inspector would secure a "shadow" picture similar to that on an x-ray negative, showing the internal condition of his product.

Xeroradiography has definite advantages over rapid film development processes in that it is entirely free of chemicals and employs re-usable plates. Because the xerographic plate is recharged every time it is used, the effect of radiation is minimized and satisfactory pictures can be obtained. It has a possibility for application in the field of certain medical diagnosis.

Xeroradiography is being developed at Battelle under Haloid-Battelle sponsorship. General Electric X-Ray is cooperating in the project and will market the equipment, when perfected, through its nation-wide network of district offices. The new process is an outgrowth of xerography, a method for producing fast, low-cost copies of anything written, printed or drawn, using light rather than x-rays. Xerography, already commercially available, is a product of The Haloid Company.

Billion Dollar Business

Military research and development, particularly in electronics is now a billion dollar business and is still growing. The Department of Defense research and development board points to the development of radar, atomic energy, proximity fuzes and guided missiles as indicating the necessity for a wide range of research and development. The long-range program of the board contemplates the active cooperation of industrial research facilities, colleges, and scientists. Industry can provide resources for a great variety of effort in the areas of applied research and development, production, and engineering vital to defense.

USAF Case-and-Item Control Begun

New System Utilizes Electronics

A new supply control system, recently inaugurated by the supply division, Air Materiel Command, includes the use of electrical accounting machines to keep records, and an elaborate world-wide communications system to transmit messages. The new system, designed to speed delivery of supplies and keep an up-to-date account of the whereabouts of all cases and items shipped by the Air Force, is a result of Air Force efforts to gear up oversea supply procedures to meet the urgent world-wide needs of the national emergency.

Case-and-item control is made possible through utilization of a world-wide teletype and radio system, which speeds supply requisitions from overseas installations to a monitoring point in the continental United States.

Bowie Heads Canadian Telecom

The appointment of Douglas Forrest Bowie, of Montreal, as president and general manager of the Canadian Overseas Telecommunications Corp. was re-

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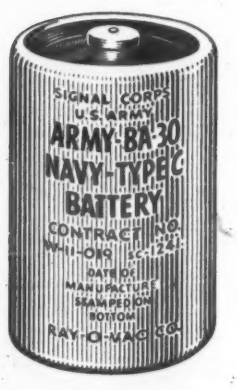

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RAY-O-VAC LEAK PROOF BATTERIES

A page from the note-book of Sylvania Research

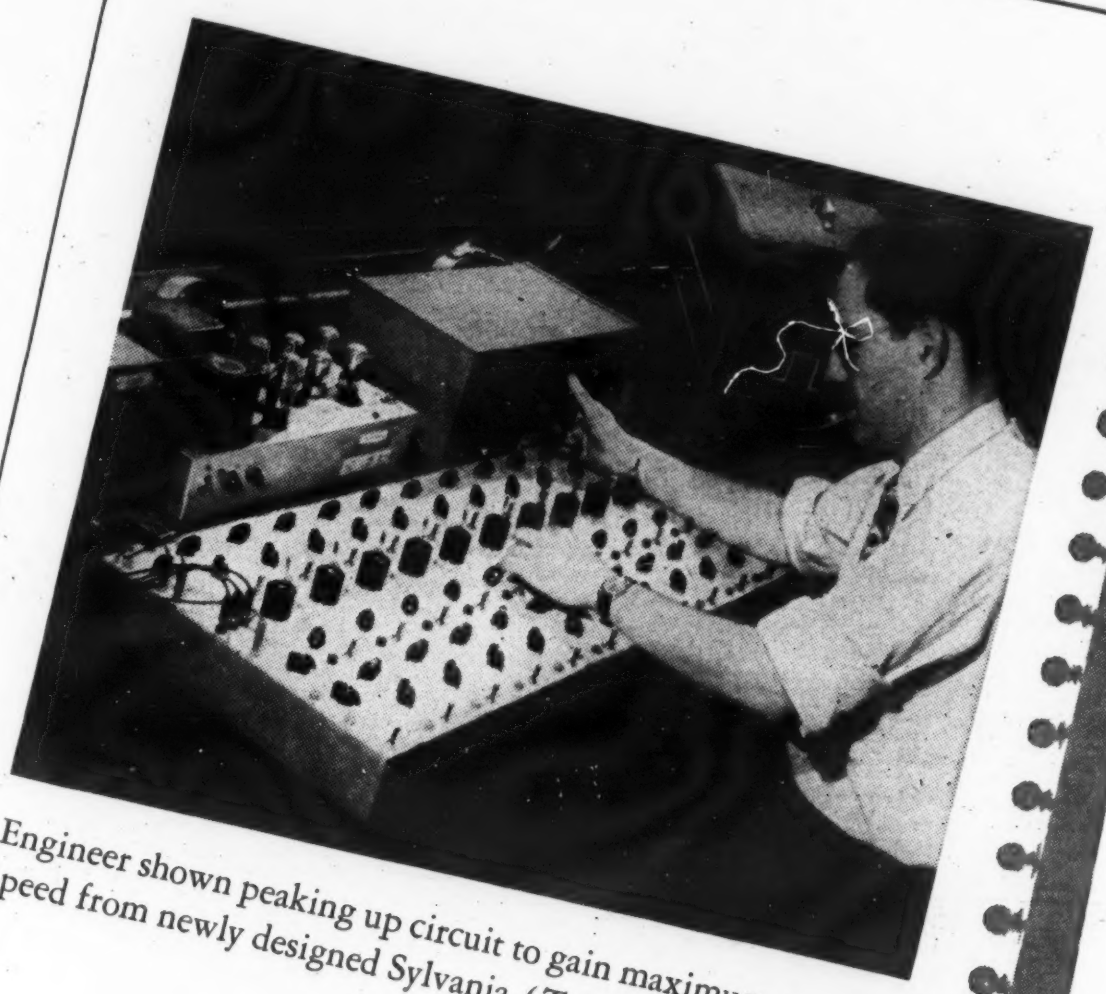
Sylvania engineering aids the development of a Subminiature Decade Counter

The apparatus shown at right is a test board, engineered by Sylvania for the development of a Subminiature Decade Counter.

Of special interest are the tiny Sylvania Subminiature Trigger Tubes which fire with a small negative pulse to the grid. No other electronic tubes or crystal diodes are required in the counter circuit.

This test board allows for independent variation of all the condensers and resistors in the complete decade circuit. Thus the circuit can be optimized to gain maximum counting speed for each new improvement in tube design. As a result, both tube and circuit development progress simultaneously.

This counter test board is a typical example of the ingenuity of Sylvania engineers in exploring new techniques . . . new approaches to the development of new and more efficient products.



Engineer shown peaking up circuit to gain maximum counting speed from newly designed Sylvania (T-1) Trigger Tube.

SYLVANIA ELECTRIC

ELECTRONIC DEVICES; RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC TEST EQUIPMENT; FLUORESCENT TUBES, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS; TELEVISION SETS

cently announced in Ottawa by Canadian Minister of Transport Lionel Chevrier. Mr. Bowie succeeds David L. Howard who died June 6 at the age of 58. Mr. Bowie has been in charge of the company's operations since Mr. Howard's death.

Assistant to the president since the inception of Canadian Overseas Telecommunications Corp., Mr. Bowie has had 30 years of unbroken operational, technical, and administrative service in overseas telecommunications, and served in many parts of the world before taking up permanent residence in Canada 20 years ago. Born in 1904 of Scottish parents, he received his early education in London, and was trained in the fundamentals of the telegraph field in the Eastern Telegraph Co.—later Cable and Wireless, Ltd.—rising through the ranks in assignments at various points in the company's worldwide operations.

New Electronics Changes Training

Increased use of vital electronic equipment in military aircraft has caused a complete revamping of training so as to provide aircraft observers adept at the new skills required by tremendous speeds and all-weather conditions. A new observer training plan will be embodied in the aviation cadet flying training program with the first class scheduled to start September 15 at Ellington Air Force Base, Texas.

Procurement Consolidates

The Signal Corps has consolidated its procurement and industrial mobilization branches to better meet its problems. As mobilization plans progressed the planning and current procurement activities have come closer together. The consolidated office will be known as the procurement branch of the procurement and distribution division of the OCSigO.

The new branch is headed by Lt. Col. K. M. Gonseth, who had directed the industrial mobilization activities.

The 1960th, An AACS Link

One of the longest airway stretches in the world is an airlane 1700 miles long and 50 miles wide reaching across the middle of the North Pacific from Johnston Island Air Force Base to Guam. This airlane is controlled by the 1960th Airways and Air Communications Service Squadron located on the remote coral atoll called Kwajalein.

The 1960th AACS Squadron provides air-to-ground and ground-to-ground communications for the aircraft of the Military Air Transport Service Pacific Division flying the southern route of the Pacific Airlift. It is also responsible for the Navigational aids and in-flight traffic control.

Controlling the MATS and commercial aircraft halfway between Johnston Island AFB and Kwajalein, a stretch of 800 miles, the 1960th Squadron guides the planes safely into Kwajalein. By radio the aircraft are shepherded over the 900 mile stretch to halfway between Kwajalein and Guam. During this trip the 1960th assures that the planes fly at the proper altitudes to prevent collisions in mid-air. The 1960th AACS Squadron is another of the vital links in MATS globe-girdling AACS system.

Air Pictorial Service

Recently set up by the Air Force, the Air Pictorial Service has been formed to produce documentary, training, public relations, and combat films. The films will be processed for television as well as for regular motion picture presentation.

To assist in formulating operation plans for the pictorial project, the Air Force has engaged the architectural-engineering firm of John & Drew Eberson, particularly in reference to facilities, equipment, and procedure. The Eberson firm has also been employed by the Canadian government to design the proposed new $8 million facilities for the Canadian Film Board's production activities in Montreal.

"Fan-Out" Warning Communications

A "fan-out" system of radio and telephone communications on a nation-wide scale to alert civilian airports and to immediately recall aircraft in flight over any section of the United States, in the event of attack or other emergency, was expected to be the main topic of discussion at the summer meeting of the board of directors of the National Association of State Aviation Officials, July 19-21 at Kentucky State Park.

Under the proposed "fan-out" communications network, the CAA is to be notified of probable enemy air attack or of other emergency conditions simultaneously with the alert given to the Civil Defense Administration by the Air Defense Command. Approximately 300 Civil Aeronautics control airports will then be notified by either radio or telephone comunications, and will in turn, each alert about ten auxiliary airports, which will send out emergency warnings to aircraft in flight in their respective areas, reporting, in some cases, to sending out "smoke signals" from burning piles of debris previously gathered near the airport, to recall the planes.

Signal Corps Wants Specialists

The U. S. Civil Service Commission has announced examinations for filling electronic specialist positions in the Signal Corps at various locations throughout the U.S. The grades to be filled are GS-7 and GS-8 at salaries of $3825 and $4200 a year.

To qualify, applicants must have had at least 3½ years of appropriate general and special experience. Pertinent study in the physical sciences or engineering above high school level may be substituted for most of the experience. No written test is required.

For "general experience" applicants can qualify who can show that they have had progressively responsible experience in the inspection, installation, construction, or repair of mechanical or electrical instruments, equipment or accessories or in the identification and classification of components thereof.

"special experience" requirements.

A wide latitude is allowed under "special experience" requirements, wherein applicants can qualify who have had one or more of the following types of experience:

1. Physical inspection of electronic equipment to determine conformity with drawings, specifications or material requirements of contracts or orders;

2. Installation of radios in commercial vehicles, including experience in reading and interpreting specifications and drawings and a working knowledge of technical vocabulary of electrical and electronic science;

3. Repairing home radio and television receivers, provided that the applicant's duties included trouble shooting, reading circuit diagrams, using test equipment, and checking and replacing components such as transformers, resistors, condensers, etc.;

4. Amateur radio operator experience if the applicant designed, constructed, modified or maintained his transmitting, receiving and auxiliary equipment;

5. Instruction experience in the installation, operation, or repair of communication and electronic equipment.

The age limits are 18 to 62; are waived to veterans.

Applications, made on Form 57, Card Form 5001 ABC, or veteran's Preference Form 14, obtained from Civil Service regional offices, should be sent to the Executive Secretary, Board of U.S. Civil Service Examiners, Signal Corps, 2800 South 20th St., Philadelphia 45, Pa.

Sacramento Depot Has New Paper

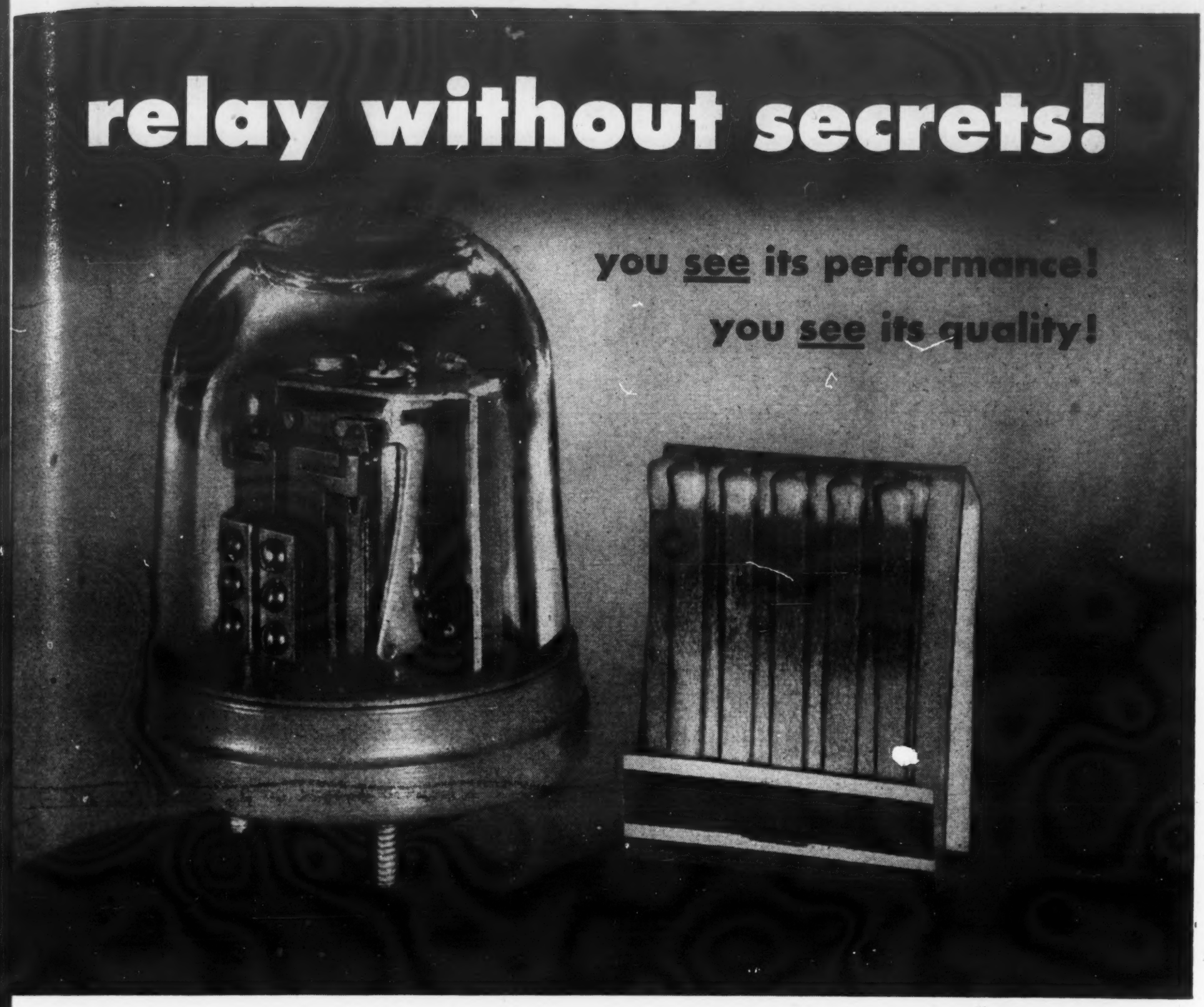
The Signal Corps' Sacramento Signal Depot began publication July 6 of a tabloid format bi-weekly newspaper, *The Intercom*. For the editors' accomplishment SIGNAL adds its congratulations to those of the depot's commanding officer, Col. F. T. Gillespie, who told the staff that "it is my opinion that this newspaper will provide another link to our already strong chain of unity here at the depot."

"EUSAK Signals"

Korean War "Trade" Publication

The operations and training division of the Eighth Army Signal Section has turned publisher with the production, in the Korean Theater, of a "trade" journal for signalmen. The latest circulation report of the new "EUSAK Si

relay without secrets!



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CHICAGO

nals" is given as 417, but it is expected that the copies will be passed around among officers and men until every soldier in the Eighth Army who uses Signal Corps equipment will have read a copy.

"Pass the information," might well be the editorial slogan of the magazine, says its editor, Capt. Gordon M. Parks. "Our sole purpose in getting out this publication," he explains, "is to keep everybody up-to-date on the latest wrinkles in Signal Corps equipment. Korea has taught us many lessons in how and how not to use communication equipment here. The standard procedure would be to pass this information directly up the line and wait until it was broadcast back to everyone in the field. We still send the information up the line, but we are also broadcasting it into the field as quickly as we can with EUSAK Signals."

"We lean heavily on our readers to send us their tips and short cuts to better operation and maintenance of their equipment," adds Capt. Parks. "All we try to do is this: If some outfit over here in one division has a good workable idea that is saving time or effort, then we want to tell the other outfits about it. That's our editorial policy in a nutshell."

British Physicist At SigCorps Labs

Initiating a plan for direct coordination between personnel at the Signal Corps Engineering Laboratories, Ft. Monmouth, N. J., and internationally famous scientists in relevant fields of research, Professor S. Tolansky, physicist at the Royal Halloway College, University of London, recently arrived at the Labs where he opened his stay with a three day lecture and demonstration series.

Professor Tolansky has pioneered in research on multiple beam interferometry, dealing with physical techniques useable for study of surfaces and ultra thin film, down to atomic dimension. During his stay at the Labs he will work directly with Signal Corps scientists and engineers, guiding them in setting up of equipment and in studying special problems which may be solved through application of techniques perfected by him. In charge of coordinating program activities for Professor Tolansky during his four-week visit is Norman J. Field of the micro-optical section, Squier Signal Laboratory at Ft. Monmouth.

Noise Suppression Demonstration

A demonstration staged by the communications equipment branch, engineering and technical division of the Office of the Chief Signal Officer, and technicians from Coles Signal Laboratory, was recently held at the Pentagon to show the general staff, procuring services of the Army, and other interested parties the extent of radio interference resulting from operation of a number of gasoline engine-driven equipments.

Three vehicles and a fork lift truck were used in the demonstration. One of the vehicles carried a minimum of suppression and a second vehicle, a new type military truck, was equipped with a suppression system in accordance with the Army's principal specifications. The third vehicle and the fork lift truck had no suppression applied. It was shown that suppressed equipments caused extreme interference in both the low (30 mc) and high (225 mc) frequency ranges at distances in excess of 250 feet. Difference in interference levels from the vehicles with no suppression devices and the one with a minimum suppression system was noticeable at lower frequencies but not at higher frequencies.

The fully suppressed production tactical vehicle did not create interference in either high or low frequency range, even with receivers set at maximum sensitivity and antennas five feet from the vehicle.

Signal Corps Personnel Changes

Cassevant, Procurement-Distribution

Colonel Albert F. Cassevant has been assigned from the student detachment, National War College, Ft. McNair, Washington, D. C., to duty in the procurement and distribution division, OCSigO.

Cody to Military Training Branch

Colonel Thomas J. Cody has been transferred from personnel and training division, OCSigO, to duty in military training branch, personnel and training division, and designated chief of that branch.

Mickelsen, Special Assignment Group

Colonel Arthur E. Mickelsen, formerly director of the Standards Agency, Munitions Board, Office of the Secretary of Defense, has been assigned to special assignment group (boards and committees) OCSigO.

Other Changes

Lt. Colonel Wayne P. Litz, from military training branch to personnel and training division, and designated acting assistant chief of the division.

Lt. Colonel Bruce W. Caron to military training branch of the personnel and training division, OCSigO, from assignment as PMS&T at the University of Illinois.

Lt. Colonel Luther E. Johnson to special projects branch, engineering and technical division, OCSigO.

Lt. Colonel Arthur W. Reese to plans and operations division, OCSigO. Both from assignment to student detachment, Command and Staff School, Ft. Leavenworth.

Major Luther Calkins, from Signal Corps Photographic Center, Long Island N.Y. to motion picture branch, Army pictorial service division, OCSigO.

Major W. C. Nebauer, from ROTC instructor at Texas Technological College, Lubbock, Texas, to career management branch, personnel and training division. Capt. Gernard D. Dean from Signal Corps Engineering Laboratories to the radar and meteorological branch, engineering and technical division, OCSigO.

Major Lowell L. Wilkes, Jr., from Army communications service division to duty in fiscal and management branch, Army communications service division, and designated chief of that branch. Capt. Andrew N. Costas to duty in OCSigO and assigned to career management branch.

Promotions to Colonel:

Marshall D. Barr, Walter B. Bess, Donald R. Bodine, Charles F. Fell, James M. Kimbrough, Jr., William B. Latta, Ralph D. McKinney, Robert B. Miller, Frank W. Moorman, George F. Moynahan, Jr., George W. Rhyne, and Walter A. Simpson.

Promotions to Lt. Colonel:

Paul C. Davis, Paul C. Day, Francis L. Duggan, Donald Heck, Earl J. Holliman, John C. Liggett, Penrose S. Mellinger, John M. Moss, Willard A. Muir, Arthur Raney, and William M. Shepard.

New Communications Assistant Chief

Colonel William D. Hamlin, a recent graduate of the Industrial College of the Armed Forces, on July 26 replaced Lt. Colonel Dayton W. Eddy as assistant chief of the Army communications service division, Office of the Chief Signal Officer. Col. Eddy, who had held the post for three years, went from the Pentagon to Norfolk, Virginia, where he became a student at the Armed Forces Staff College.

A U.S. Military Academy graduate (1929), Col. Hamlin began his Army career with the Signal Corps.

Prior to his attendance at the Industrial College, Col. Hamlin was signal officer of IX Corps, in Japan, from 1948 to 1950. Before that he was advisor to the department of communications, U.S. Military Government in Korea. During the early part of World War II, in 1942-43, Col. Hamlin was executive officer in the OCSigO. From October 1943 to June 1945 he was with the signal division of SHAEF in Europe.

Col. Eddy served the entire World War II period in the Pacific, part of the time as commanding officer of the signal operations group which furnished the communications for Gen. MacArthur's headquarters. In June 1946 he was assigned to the OCSigO, first as executive officer in the Army communications service division, and later as its assistant chief. Between the period of his graduation from the University of Vermont in 1937 and his call to active duty in 1940 he was employed by the Western Union Telegraph Co. as an engineer.

jack-in apparatus

THE LEICH DIAL SYSTEM, WITH JACK-IN APPARATUS, PROVIDES THESE PRACTICAL ADVANTAGES:

SAVES MONEY It is far less expensive to add a link (connecting circuit) or ten lines to the Leich Dial System than to any other dial switchboard of the same type. No factory installers are necessary. No revisions or additions in wiring are needed. The only expense is for the extra link or lines which are easily jacked-in by your own switchboard man.

SAVES TIME Ten lines can be added to the Leich Dial System in ten minutes. A finder-connector link can be added in about two hours. These units are carried in stock at the factory, are shipped in individual cartons ready to be jacked-in. No soldering is necessary.

NO NEED TO TIE UP SERVICE IF TROUBLE DEVELOPS Supposing a case of trouble develops on a link. All that's necessary to keep the board working to capacity is to slip out the link in trouble and jack-in a spare link. The one in trouble can then be repaired at your leisure.

EASY TO REGROUP FOR CHANGING TRAFFIC CONDITIONS The jack-in feature makes it a simple matter to slip out the switches and relay bar of a link. This link can then be jacked-in to a Leich Dial System in another exchange where increased traffic makes it necessary.

LESS CHANCE FOR ERROR . . . LESS POSSIBILITY FOR POOR CONNECTIONS The links in a Leich Dial System are connected to all the lines in the multiple by stainless steel bars which are slid out when adding or removing links. These bars are inserted through Bakelite guide blocks, thus cannot be crossed are transposed. Poorly soldered joints are impossible because there are none.

Leich has been manufacturing telephones, switchboards and associated communication equipment since 1907. The combination wall and desk telephone, and many other improvements in modern telephony are Leich developments.

SALES CORPORATION • 427 W. RANDOLPH ST., CHICAGO 6, ILL.

Spirit of the 97th

(*Continued from page* 11)

nished signal operation for the war crimes trial at Nurenberg. In spite of constant personnel changes our post war job was well on its way. It was just like starting all over again . . . new replacements had to learn and learn fast.

We had heard rumors about an elite force of super troopers being formed in Germany called the United States Constabulary, and that the 97th would become a part of it. Quite an honor to be picked for what was going to be the Crack Troops of the United States Army.

On the 10th of March 1946 the rumor became true . . . our name was changed to the 97th Constabulary Signal Squadron. We had to reorganize entirely because this was the first time a unit like this was ever formed in the history of the Army. By June 1946 we had to completely train ourselves for our new task as Constabulary troopers. Our communications tasks were cut to a minimum . . . well, almost anyway. There were those extra jobs of putting in land lines, VHF, and HF radio, setting up a Constabulary Signal Center, establishing motor messenger service, installing radios in armored vehicles and setting up radio repair teams. The few of us that were trained had to carry the load, so the other fellows could get their turn at training. The results began to show, though, in spite of the handicaps. April saw 500 lines of dial telephone, VHF radio and HF radio networks well under way. Twenty-six of us were installing fifteen radios a day in Constabulary armored vehicles.

Dressing Up

On July 1st, 1946, the U. S. Constabulary became a reality. Our outward appearance changed. Jeeps were fancied up in bright yellow, blue, and red. So were we . . . shiny leather, yellow scarfs, and slick looking boots. It wasn't all fancy dress, though. Our training period had to be cut off and actual communications began for the main United States Occupation Force of Germany. The unit now consisted of Headquarters and Headquarters Detachment, "A" Troop "B" Troop, and "C" Troop.

Our Very High Frequency circuits were put to use and we found them far superior to the German land lines at that time. The high frequency radio sent its signal from antennas on the tallest trees near Bamberg. Our Constabulary commander, Major General Harmon, spent a lot of time making on spot inspections all over the U. S. Zone, so we gave him communications right from his special train wherever he went.

I can remember how cold it got in Bamberg, and the ice we had to chip off the barracks floor. You won't believe it, but ashes had to be put on the floor to keep from slipping. I still get the shivers thinking about it.

The task of occupying Germany required fast, organized communications. We began furnishing almost every electrical means of communications available to the Army, and the new men were learning how to be signal technicians in a hurry.

The beginning of 1947 found all of our major signal projects finished and we were busy ironing out the rough spots.

On 14 February 1947, Constabulary Headquarters moved to Patton Barracks Heidelberg. This move was easier, though. We took over the Third Army Signal Center, lock, stock, and barrel. The change was made darn fast. The VHF network was rearranged and tied into telephone lines furnished by the Heidelberg Deutches Post. There wasn't any telephone equipment at Patton Barracks so we put in a PABX with attendance boards for use of Constabulary Headquarters.

The 301st Signal Battalion helped us out a lot by staying in operation until we had our communications in operation from Heidelberg.

On 15 July 1947, our mobile radio troop, "A" Troop, was deactivated. A lot of us were sorry to see "A" Troop drop away from us, but later "C" Troop was renamed "A" Troop.

A new year 1948 came and with it . . . another move . . . this time it was towards Stuttgart, Germany. We billeted down in the Panzer Kaserne, Boeblingen, and readied ourselves for furnishing communications for U. S. Constabulary from the Vaihingen Kaserne.

This move was entirely different from our previous move to Heidelberg. We had to start from scratch. The billets sure had a lot of floor space to scrub and walls to paint. All the signal means had to be installed at Vaihingen. It meant plenty of work because the general wanted to talk to his command . . . in a hurry. All of us chipped in and we soon had a six-position manual switchboard and VHF and HF frequency radio nets in operation. The Constabulary Command Post closed in Heidelberg and opened in Vaihingen at 1500 hours 1 February 1948.

Before long we had a complete new signal section, installed a telephone central office, constructed a cable distribution system, built two complete radio stations and rehabilitated our new home in Boeblingen. It was a proud day when Major General Withers A. Burress, our Constabulary commander then, personally commended us for what we had accomplished.

For the rest of the year we operated and trained, and our morale was high. The Inspector General even gave us a superior rating during his inspection. It was the first time any unit in the command was ever given the maximum rating for everything.

The occupation of Germany was beginning to show success and our role in Germany began to change from purely occupation duties into a fast moving defense force. This called for mobility . . . and communications that were mobile. VHF was mounted on trucks and we were expected to move our communications fast. A lot more time was spent in the field.

Let me tell you about the mottoes and signs that were placed around Panzer Kaserne. Headquarters had "Not the biggest but the Best" . . . "A" Troop had "The Able Troop" . . . and "B" Troop had "The Best Troop."

And there was that sign that said, "V.D., not me, I'm a 97th Man," . . . and the aluminum swagger sticks most of the officers carried around . . . or a sexy picture that Mess Sgt. Snider had painted on the first three graders mess wall . . . the battalion commander, Colonel Clapper, had it changed to a bird scene.

Something new was added when we received a brand new mobile communication center early in 1949. As soon as we received it, a test was made in operation near Ulm . . . in very cold location . . . cold? . . . even the gasoline froze.

Field Exercises

The next big show was April Showers. That was a honey of a problem. Everything seemed to click from our command post near Ketterbach, Germany. Well, we all felt pretty good after that maneuver.

The problems got tougher, though, and a lot more was expected of us during Exercise Grafenwoehr in July and Exercise Harvest in September. We supplied communications for the Aggressor Forces against the First Infantry Division, during Exercise Harvest. Our job was to furnish communications to points all over the U. S. Zone, while the units of Constabulary shifted all over the place.

Between field problems and command post exercises, operation continued twenty-four hours a day for the main occupation forces of Germany.

Exercise Shoepac was the first field problem that faced us in 1950. Our commanding officer was Lieutenant Colonel Walter B. Bess. The U. S. Constabulary by this time was formed as a striking force with the task of guarding the United States interests in Europe.

Then in March we took part in Exercise Shamrock. When it was over the former Chief of the EUCOM Signal Division, Major General Matejka during a briefing said, "I personally think a very fine job has been done. Every man I saw in the communication business was working hard and intelligently at his job. I think these people deserve a great deal of credit for their fine performances."

(*Continued on page* 80)

Ready for NATIONAL DEFENSE

because our peace time production is closely allied to military applications

Every day numerous military applications are being found for standard line Motorola equipment. Our experience in the past with military communications has been carried over into civilian uses and improved upon. Now, with extended research and stepped-up production efficiency, we stand ready to offer once again front-line defense communication systems at the moment of need.

Fields of Current Motorola Research:

- Microwave
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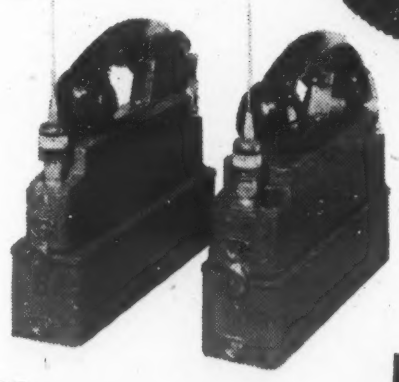
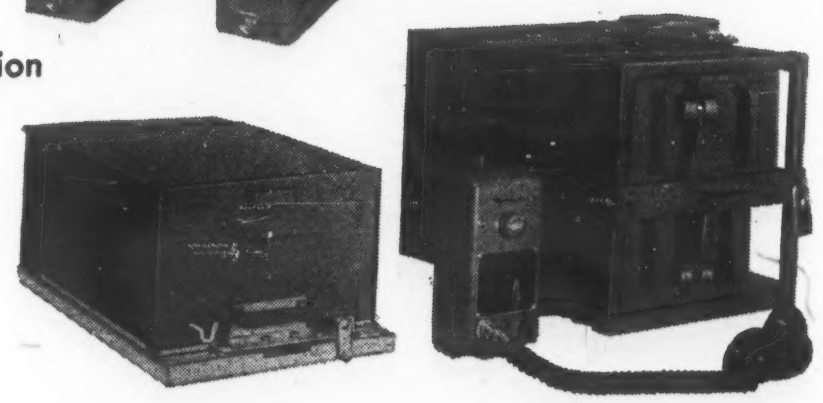
- Countermeasures
- Carrier Relay Equipment
- FM Receivers and Transmitters in VHF and UHF Bands
- Production-Proven Sectionalized Sub-miniaturization
- Pulse Code Modulation
- Radar Search
- Radar Beacons
- Gamma Ray Technique
- Selective Signaling
- Telemetering
- Servo-Mechanisms
- Digital Computers





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Raytheon

(*Continued from page* 31)

government contracts is today almost as great as it was at the end of the war, and is, of course, steadily increasing under the impetus of the rearmament program.

With the end of the war, Raytheon started to implement its plans for peacetime competition. Its board, scorning the opportunity to break up the organization, divide war time profits and shrink the company to its former size, was determined to utilize and supplement the vast store of knowledge and skills it had accumulated to build a commercial organization which would rank as one of the leading concerns of the country. As a logical step in this direction the company acquired, or merged with Submarine Signal Company (Boston), Belmont Radio Corp. (Chicago), and Russell Electric Company (Chicago), each of which, like the parent company, enjoys a sparkling record of achievement.

Submarine Signal's underwater aids to navigation logically fitted into Raytheon's radar program for the marine field. Since 1901, when founded by W. Cameron Forbes, Henry M. Whitney, and a group of other influential Bostonians interested in safety at sea, the Submarine Signal Company has been building marine safety devices based on transmission and reception of sound through water. In World War I the company developed and produced equipment for the detection of enemy submarines. In the peacetime period between the wars, it developed the FATHOMETER,® depth-reading mechanism which became its principal commercial product. During this same period the company reached a high point in its history when it disclosed the first complete radar system. As early as 1930 it had revealed complete systems for distance and direction measurement basic to all present radar devices, but the results were never highly publicized for the United States Navy, realizing the enormous military importance of the development, asked that all further work be kept secret. In World War II, Submarine Signal Company's development and production of supersonic echo-sounding and echo-ranging apparatus (sonar) rivalled the importance of work done on the magnetron and radar. It also continued its work on radar and in the closest association with the OSRD Radiation Laboratory at the Massachusetts Institute of Technology, built thousands of marine radar sets and radar fire control apparatus. Today the Submarine Signal Division of Raytheon continues the high standard of production, engineering and service for the merchant fleets and the United States Navy, which have won it a world-wide reputation.

So throughout the entire world while Raytheon's commercial Radar searches the surface of the water, its Submarine Signal FATHOMETERS are searching the waters below. The principle of operation of the two equipments are much the same except that in the case of radar high frequency radio energy is used while the FATHOMETER® is dependent on supersonic energy. Once generated this energy is projected from the bottom of the ship and travels down until it strikes a target at which time a part or all of the sound waves are reflected back to the FATHOMETER.® A measure of the time necessary for the energy to make a round trip can, of course, be translated into a measure of the depth of the target below the vessel.

The depth of the target in either feet or fathoms is shown on various types of indicators, from which the captain can tell whether or not there is a safe margin between the bottom of his vessel and the bottom of the ocean; or he can compare the depth with those on his charts and use the information for more precise navigation. The fisherman can detect schools of fish which reflect a part of the energy and can then drop his nets in the proper spot and to the proper depth; or he can locate the noise at the bottom of the ocean or wrecks on the ocean floor where the "big ones" hang out, and drop his lines or net accordingly.

Belmont Radio completed the framework for Ratheon's eventual entry as a leader in the television and radio receiver field.

The Belmont Record

Founded in 1928, Belmont Radio has long been one of the six leading manufacturers of radio sets and of first importance in the "private brands" fields. Its record of engineering and production achievement in the radio industry has also been outstanding. For example numbered among the many Belmont firsts in the industry are: permeability tuning; mechanical cam and lever push-button tuning; permeability tuned I.F. systems; the AC-DC superhetrodyne in its present form; the low-voltage battery receiver; and the vest pocket radio. In addition, since 1937 Belmont has conducted a very substantial television research program.

Belmont's contributions to the war effort, resulted in the award of four "E's," and during this time it produced all ground IFF equipment for the Army and Air Force; a majority of all type 348 communication receivers used in all multi-motored aircraft; the tank FM receivers; infra-red communication equipment; and radar synchroscopes.

Once again a sound program of engineering research and wide spread experience gained over a period of years has been utilized to give the public one of the finest TV receivers on the market today. Manufactured in Chicago the '51 line includes everything from a 17" table model on up through a 20" combination TV, AM & FM radio and phonograph console, all competitively priced and distributed in the major markets under the Raytheon name.

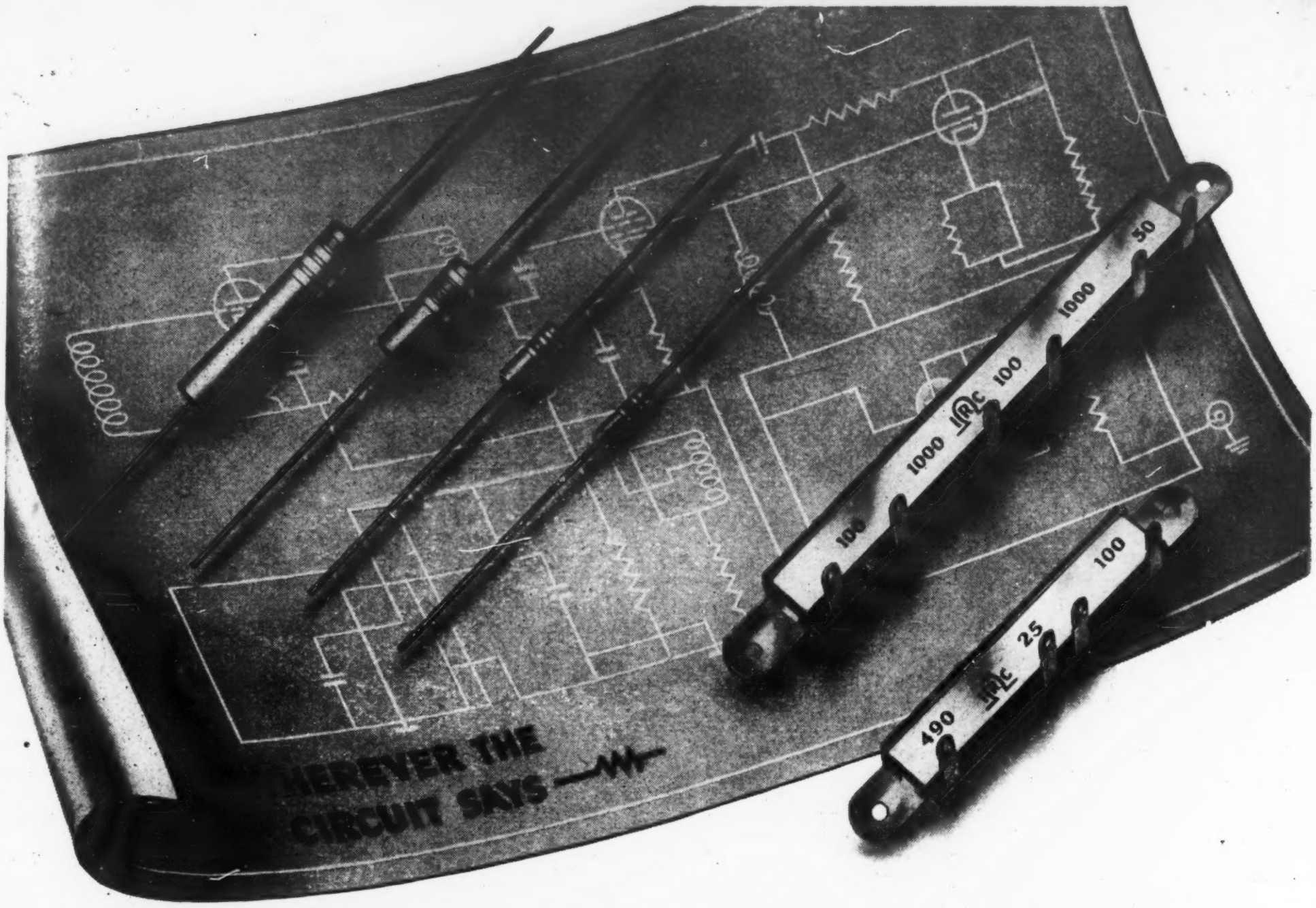
Russell Electric, a foremost manufacturer of fractional horsepower motors for phonograph, washing machine, electric fan, and air conditioning and ventilating industries, further strengthens Raytheon's position in the television and radio receiver fields.

Building on this breadth of experience, Raytheon has, in the period since the war, materially advanced its position in new fields. It has developed new products and improved the design of standard electronic equipment. It has carried the art of electronics into many fields through the medium of such products as:

Its *"MARINERS PATHFINDER"*® commercial equipment.
Its *"FATHOMETERS"*® super and ultrasonic echo depth sounders for all types of ships.
Its *"MICROTHERM"*® microwave diathermy equipment.
Its *"RADARANGE"*® electronic cooker.
Its *"WELDPOWER"*® line of bench mounted welding heads and stored energy welding controls.
TV and AM-FM radio receivers.
Television and microwave equipment for remote pickups and station-to-station telecasting.
Mobile and marine radio telephones for both land and marine use.
Electronic tubes including receiving, subminiature, hearing aid, special purpose, klystron, and magnetron types, as well as TV picture tubes. also Geiger-Mueller, counter tubes and electrometer tubes for radio activity meters.
Magnetic components, including transformers and voltage stabilizers, its "RECTICHARGERS," telephone battery chargers, and its RECTIFILTERS, telephone battery eliminators, and its "RECTI-RINGER," combination battery eliminator cycle ringing supply.
Fractional horsepower motors.
Germanium crystal diodes.
Transitors.

The continual advance of electronics is inevitable. Raytheon, by its use of facilities that are modern and efficient, one of the world's largest groups of electronic engineers, and well integrated research, development, manufacturing and sales programs, will keep in the forefront of this advance. Daily it is playing a more important role in the everyday life of people throughout the world.

Raytheon enters the second half of the 20th century with the conviction that the time since its creation has been well spent and that it has laid a firm foundation for even greater contribution to the weal of the country through Excellence in Electronics.



HOW VERSATILE CAN SMALL RESISTORS BE?

Critical electronic circuits demand *versatile* resistors —unusual characteristic-combinations. Ever-narrowing space intensifies the need for small-size units. *Can small resistors be versatile enough for your application?*

Shown above are two we are sure will meet your requirements.

IRC Advanced Type BT Resistors have set new performance standards for fixed compositions. At ⅓, ½, 1 and 2 watts, BT's meet and surpass joint Army-Navy Specifications (JAN-R-11) and easily meet the rigorous requirements of television. Exclusive construction features provide extremely low operating temperature; excellent power dissipation; high resistance to aging, humidity and salt water immersion. Yet Type BTR and Type BTS are tiny units—only 13/32" in body length!

Where wire wound resistors are desired, IRC Type MW's are unsurpassed for adaptability to an extremely wide variety of design requirements. Small, flat design saves space. Low initial cost, lower mounting cost, flexibility in providing taps at low cost—all add up to economy. Mounting bracket actually transfers heat to outside of chassis—for unusually rapid dissipation. Also, the MW may be operated at its full "on plate" rating, whether enclosed or not, without exceeding its rated temperature rise of 100° C.

We'll be glad to send you full technical data on these IRC resistors. Just mail the convenient coupon.

For fast delivery on your small-order requirements for standard resistors, rely on IRC's Industrial Service Plan. It enables your IRC Distributor to give you 'round-the-corner deliveries right from his local stocks. We'll be glad to send you his name and address. International Resistance Co., 401 N. Broad St., Philadelphia 8, Penna. In Canada: International Resistance Co., Ltd., Toronto, Licensee.

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Please send me additional information on the items checked below:—

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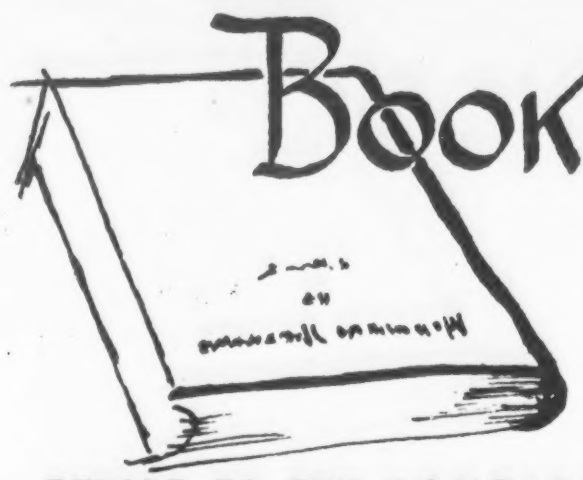

Books — and services —

National Best Sellers

Compiled on a Percentage Basis from the Reports of 60 Booksellers as listed in Publishers' Weekly for July 14, 1951.

FICTION

1.	From Here to Eternity, *by James Jones*	$4.50
2.	The Caine Mutiny, *by Herman Wouk*	$3.95
3.	Proud New Flags, *by F. van Wyck Mason*	$3.00
4.	Return to Paradise, *by James A. Michener*	$3.50
5.	A Woman Called Fancy, *by Frank Yerby*	$3.00
6.	The Foundling, *by Cardinal Spellman*	$2.75
7.	This is the Hour, *by Lion Feuchtwanger*	$3.95
8.	The Troubled Air, *by Irwin Shaw*	$3.75
9.	Old Herbaceous, *by Reginald Arkell*	$2.00
10.	God's Men, *by Pearl S. Buck*	$3.50

NON-FICTION

1.	Kon-Tiki, *by Thor Heyerdahl*	$4.00
2.	Washington Confidential, *by Jack Lait and Mortimer Lee*	$3.00
3.	A King's Story *by the Duke of Windsor*	$4.50
4.	His Eye Is on the Sparrow, *by Ethel Waters and Charles Samuels*	$3.00
5.	A Soldier's Story, *by Omar N. Bradley*	$5.00
6.	Communism, Democracy and Catholic Power, *by Paul Blanchard*	$3.50
7.	Better Homes & Gardens Garden Book	$3.95
8.	Out of This World, *by Lowell Thomas, Jr.*	$3.75
9.	Rommell the Desert Fox, *by Desmond Young*	$3.50
10.	We Barrymores, *by Lionel Barrymore and Cameron Shipp*	$3.50

REPORT TO THE COMBINED CHIEFS OF STAFF. By The Supreme Allied Commander, South-East Asia, 1943-1945, Vice-Admiral The Earl Mountbatten of Burma, K.G., P.C., G.C.S.I., G.C.V.O., K.C.B., D.S.O. Philosophical Library, Inc. 280 pages. $12.

The decision of the combined chiefs of staff that the Allies, during World War II, should concentrate first on the defeat of the Germans, gave the South-East Asia theater last place on the priority list for men, material, and munitions. Yet the men who were there, under the overall command of Mountbatten, fought with what they had and smashed the Japanese in their design for the invasion of India.

This report to the combined chiefs of staff is Lord Mountbatten's personal account of what happened in his command from its inception in August 1943 to the capitulation of the Japanese two years later. Giving due consideration to the factors affecting the campaign he describes the progress from the defense of Imphal, the victory at Kohima and Stilwell's capture of Myitkyina to the opening of the road to China, Slim's crossing of the Irrawaddy on a wide front and his success in outwitting the Japanese by a sudden thrust at Meiktila, which led to the capture of Mandalay and the spectacular advance by Fourteenth Army down the center of Burma and the final dash to Rangoon before the Monsoon.

Illustrated with 47 excellent maps and charts, Mountbatten's report could well be regarded as a classic on campaigning in jungle territory. It will be of especial interest to the men who served in the South-East Asia theater, but it also must be an indispensable segment of anyone's World War II library.

EPICS OF ESPIONAGE. By Bernard Newman. Philosophical Library. 270 pages. $4.50.

A factual accounting of some of the espionage classics of history, contrasted to the usual romance-padded cloak and dagger spy story, this volume in its straight presentation of outstanding espionage activities carries ample drama. The chapter, for example, on the spies who almost certainly saved London from devastation, by directing the R.A.F. to Peenemunde, Germany, during World War II, is intensely interesting. The Nazis were building up the means with which to launch thousands of V.1's and and V.2's toward London, but because spies revealed the manufacture of the rockets at Peenemunde, the R.A.F. was able to mark the factory as a prime target, and in blasting it limited the number of rockets actually used against London to a fraction of the number originally being prepared.

While the espionage activities related by the author are principally those of the modern era, he outlines notable work of spies throughout the centuries. He states that there are suggestive comments on espionage in the earliest records of history, pointing out that Moses had sent spies in Canaan when he was halted in the wilderness.

No doubt everyone is familiar with a spy story, partly fact or purely fictional, by way of a novel or the stage or the movies. But in such presentations what often results from a spy's activities is not pointed up, since the romance phase of the story receives the stress. Mr. Newman, in his book, emphasizes the results, near results, and possible results of various espionage cases, wherein hundreds of thousands of lives have been lost, or saved, and the outcome of a battle or a future of a country have been affected, sometimes because of the work of a single spy.

PHOTOGRAPHY FOR TEEN-AGERS. By Lucille Robertson Marshall. Prentice-Hall. 165 pages. $2.95.

If you've been trying to help a teen-ager get started in photography here's a book which would make an excellent present for the young beginner. All phases, from understanding the camera to finishing prints, are covered in an easy-to-understand fashion. An elementary course is included on darkroom work, color photography, and there are also helpful ideas on how to make money with a camera.

PRINCIPLES OF ELECTRICAL ENGINEERING. By William H. Timbie, Vannevar Bush, and George B. Hoadley. John Wiley & Sons, Inc. 626 pages. $6.50.

In revising this fourth edition of *Principles of Electrical Engineering* the authors have rewritten most of the text in attempting to keep the book up to date. The general plan of the book, however, remains unchanged.

The valuable experience gained by the authors in teaching their own classes and in preparing the first three editions of their book is reflected in this fourth edition. They select and present material which gives the student the background he needs to understand the important methods of electrical engineering. The material is developed from mathematical physics, but the authors stress those aspects of mathematical physics which are directly relevant to electrical engineering. This emphasis is indicated in the selection of problems offered. They require the student to apply the theories he has learned to both communications and power problems.

Our Book Department can furnish any book currently in print. We will also help to secure older titles that you may need to complete your library. A 10% discount is allowed all Association members on orders of $10.00 or more. Please indicate author and publisher where known, and allow three weeks for procurement and delivery.

THE ARMY OFFICER'S GUIDE. By Col. Paul D. Harkins, USA, and Philip Harkins. McGraw-Hill Book Co., Inc. 545 pages. $6.

When we received this book we intended to do nothing more than skim through it, since its title seemed to indicate just another staid old coverage of the subject, of the kind which has been appearing annually for as long as the almanac has, and just as unchanging. But upon opening the volume we were at once agreeably surprised, and stayed with the book for a considerable time.

The Harkins' book opens in narrative style, and perhaps more than half of the volume is made up of narrative accounts of combat action or other events which form a basis for getting back to the training, or the lack of it, which had a direct effect on the action or event detailed.

Col. Harkins says of his book that it is the kind of a book he would have liked to have had as a young officer himself. He was once commandant of cadets at West Point, and was deputy chief of staff of the Third Army in World War II. In these experiences, he says, "I observed, and worked with, leaders produced by all systems of the Republic. . . . I saw them perform when the chips were down. . . . I have tried to put into this book what I have learned in twenty-three years of army life that would be of service to the young officer, the new officer, or to the man with the reserve commission coming back into the army after several years as a civilian . . . it is intended to be a guide, friend, and counseler as well as text. As a friend and counseler it was written to be informal and unpretentious."

The presentation is indeed informal and unpretentious, which contributes to its interest, but at the same time no detail appears to be lacking in the Harkins' book as to what every army officer should know.

THIS IS WAR! By David Douglas Duncan. Harper & Brothers. 176 pages. $4.95.

A book of Korean war photographs, Mr. Duncan's compilation of his own photo coverage is probably unique—at least unusual—in that the photos carry no captions. It is a tribute to his reportorial sense of drama to note that the photos need no captions. They tell their own stories.

Serious minded photographers are always interested in data with photographs, and Duncan has included pertinent data in his book.

The prints were made by Daniel Becker. He and Duncan are both on the staff of *Life*.

TRANSIENTS IN POWER SYSTEMS. By Harold A. Peterson. John Wiley & Sons, Inc. 361 pages. $6.50.

Much has been learned about electric transient phenomena during the last several decades. The pioneering work of men like Steinmetz and Heaviside was most notable in serving as a means for achieving clearer understanding of transient phenomena. Such analysis can be applied to linear circuits without reservation. However, as a circuit becomes more complex, or as the switching sequence to which a circuit is subjected becomes more complex, the application of these methods of analysis becomes very laborious and time consuming.

Tools like the differential analyzer and the transient analyzer have greatly extended the range of transient phenomena which can be analyzed successfully. *Transients In Power Systems* organized the results of many investigations with these improved tools and methods, and presents the significant data in convenient, quickly usable form. And Professor Peterson does not restrict his attention to the rigorous mathematical circuit-theory approach. He goes beyond it to discuss what the analysis discloses, and what conclusions can be reached which will be of help to the designer.

Insignia of the Association

AVAILABLE TO MEMBERS FROM THE SERVICE DEPARTMENT

The Association insignia in several beautiful designs and convenient styles authorized for wear by members is available at the prices quoted below. Order from AFCA Service Department, 1624 Eye St., N. W., Washington 6, D. C. The insignia is described as follows:

The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America and national defense—especially insofar as modern communications is concerned, our basic reason for existence. The border consists of leaves of the olive branch of peace, showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signalling in sea and land warfare by United State forces. Just above the eagle and between his outstretched wings is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, and in Naval and Marine aviation. Above that is a radar antenna array, and at the very top a radio rely antenna—for the latest major step in military communications. And none of these could exist without industry—the foundation of AFCA. In the color version there are the traditinal colors of the signal flags—dexter white with red center and sinister red with white center—with a gold border to the whole.

Members should take every opportunity to display AFCA insignia. Worn on the uniform or civilian dress, or displayed on home or office wall, it carries with it an identification of distinction, is decorative, and helps to widen the scope of our Association by bringing it to the attention of others. Emblem is available in a variety of attractive forms.

ASSOCIATION MEDAL

Wrought on the medal in sharp and bold relief is the AFCA insignia. 1⅜ inches in diameter (shown at the right, actual size), the medal is suspended from a ribbon of heavy grosgrain silk in orange and dark blue. The medal is authorized for wear on the uniform as provided in A.R. 600-40, paragraph 68g and 68c (2) (dated 31 March 1944). Prices: $3 in bronze, $4 in silver, $5 in gold. Medal is not available for issue to student members.

LAPEL BUTTON FOR CIVILIAN WEAR

Bronze	$1.50 (including tax)
Sterling	2.50 (including tax)
10-K Gold	5.00 (including tax)

Specify whether signal flags should be in red and white enamel or plain.

MEMBERSHIP CERTIFICATES

Printed on fine diploma paper with the Association emblem in full color and the member's name engrossed.
Price $1.50.

DECALCOMANIAS

Decalcomanias of the association insignia are now available from the service department. Three inches in diameter, in full color (eagle and wreath in bronze, red and white signal flags, against a silver-gray background) these decals can be transferred from either side to glass, or any other smooth solid surface, so that they will appear to be painted on that surface.

Price—4 for $1.

Radiological Defense

(*Continued from page* 27)

implement this program, a facility is built in each shipyard; this facility will contain a personnel decontamination station and a material decontamination station. The training will be by practice drill in these stations.

Fleet Radiological Training Courses. All the fleet training centers give a similar 1-week course on radiological defense. The course is open to both officers and enlisted men.

Other Courses. Indoctrination training in radiological defense, ranging from a few hours of instruction to five days, is given by a number of other Navy activities.

Correspondence Courses. A correspondence course to provide a general background in atomic energy was prepared by the Bureau of Naval Personnel shortly after Bikini. This course, identified as Elementary Nuclear Physics, is required for admission to the two-week reserve officers' radiological defense course, and is open to all regular and reserve officers. The Bureau of Medicine and Surgery has a correspondence course for both reserve and regular medical officers called Radiological Defense and Atomic Medicine.

Conclusion

As the above survey shows, a great deal has been done by the Navy, largely in cooperation with other branches of the Armed Services, in the way of training to prepare its personnel to cope with an atomic weapon attack. Furthermore, the measures taken to develop radiological defense training show a healthy spirit of mutual cooperation between all three services, and give reasonable hope that, in the event of atomic warfare, the radiological training of the armed services will have prepared them adequately to cope with any emergency.

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Spirit of the 97th

(*Continued from page* 74)

Our name was changed on 5 July 1950 from a Signal Squadron to the 97th Signal Operation Battalion, and we consisted of Headquarters and Headquarters Company, Radio Operation Company, Wire Operation Company, and a new company . . . Message Center Operation Company. This made us into a new outfit with new ways of operation . . . new responsibilities . . . and a new commander, Lieutenant Colonel Herbert R. Archibald.

We had our first chance to try out our new unit in September, during Exercise Rainbow. The memory is still fresh in our minds, of the good and bad things we did in that field exercise.

Now I have come to the point in my story where I can no longer speak of what is behind us, but instead, of what lies ahead. Everything seems to be growing in Germany. Now the unit furnishes communications for the Seventh Army and our tasks grow bigger with each day that passes. The threat of world domination by communistic elements hangs heavy over Europe. In combating this, the 97th has an important role. Everyone of us has . . . you . . . me . . . the guys over us, and the guys under us . . . and we've got to work together.

We know all you fellows in and out of the Army are depending on us, and we will try to do our darndest to furnish the kind of Communications that you deserve.

Sure we have guns and ammunition, but our big caliber ammunition is words. Just plain words, but when they are put together in a message during a tactical situation, they mean a lot. Every command that our commanding general puts out to his troops when the field, using signal means, will st on its way over a signal facility of t 97th.

The job of a front line unit is shoot large caliber ammunition strai and true; ours is to shoot words alo a path we provide from them . . . or them, in the same accurate manner.

So on our Ninth Anniversary, want the members of the Armed For Communication Association, to kn that we'll be with the units in Germa twenty-four hours a day, wheth they're American, English, or Fren units. We'll be there . . . on top that pole . . . slogging along th weary miles . . . working through t lonely night. We'll be there beca we're 97th Signal Men . . . and I'm Spirit of the 97th.

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